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PROPRIETORS: WALTER KING, LIMITED. OFFICE: 11, BOLT COURT, FLEET ST., LONDON, E.C. 4.

Telephone: Central 6055. —— Telegrams: "GASKING, FLEET, LONDON."

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POSTPONEMENT OF INSTITUTION MEETING.

IN view of the unfortunate continuance of the Coal Strike, resulting in shortage of coal and restricted traffic facilities, it has been decided to POSTPONE the ANNUAL MEETING of the INSTITUTION OF GAS ENGINEERS, which was to have opened on Tuesday, June 8.

THE foregoing is the official announcement. In view of the present grim position of affairs in the coal industry, and the curtailment of travelling facilities, the decision to postpone the meeting is a wise one, and will be endorsed by the whole gas profession. Although the arrangements for the meeting were well advanced, they will all hold good for a week to be determined by the President (Mr. Chas. F. Botley, M.Inst.C.E.) and the Council when this can be done in more propitious circumstances.

"NO"—The Government Firm.

BOTH the Miners' Federation and the coalowners have said "No" to the proposals of the Cabinet for the settlement of the difficulties in the mining industry; but on different grounds. Dealing first with the refusal of the Federation, to no point on which they are asked to make concession will they agree. They stubbornly decline to contribute anything to the rehabilitation of the industry which provides the miners with their livelihood. We do not believe the attitude of the leaders represents the views of a very large proportion of the miners, who, in some districts, appear to be tiring of their idleness, tiring of the uncertainty to which they are everlastingly being exposed, and tiring of the little money which they receive from their Union funds, compared with what the best of them are capable of earning by being at work. We are not convinced that the miners generally know that, while they have left work in defence of their leaders' policy, they are creating worse economic conditions for the industry and for themselves. However, some of the Unions are already practically in a bankrupt state; some were in low financial straits at the beginning of the struggle. There is begging for funds; and even money is being accepted by Britishers from Russia!

The obstruction to anything being done to improve, by the only means immediately available, the economic state of the industry comes from the miners' leaders and the district delegates, who often receive their "instructions" from poorly-attended lodge meetings, at which those who are present are usually the turbulent ones, and not those of peaceful inclination. The perpetual "No" of the Federation to a temporary reduction of wages, or, alternatively, to a lengthening of hours, is raising public resentment. People are more generally learning that the average rate of wages over the whole coal-fields (which average is so freely paraded, in order to gain sympathy ostensibly for the miners, but actually in support of the tactics of the Federation) does not represent the rate paid to the best class of worker in a colliery, but is the product of including the gradations of pay from the top level of worker downwards. The while, any temporary concession of wages which the miners are asked to make is being thoroughly submerged by the losses of wages through the stoppage of the industry and through the sacrifice of trade and overseas markets, which will further restrict the capacity of the industry to give employment. In other words, the men are building up a loss for themselves which will far outweigh any temporary reduction of wages they are asked to make. And that is counted as sane leadership! It is leadership in the wrong direction; and, if it is to persist, only some higher power can step in to put an end to such suicidal policy and brainless effort. It is the miners' leaders who are, by their short-sighted policy, operating with positive directness to a reduction—and a long-lived one it will be—of "the standard of living" of their following; while a temporary reduction or a little more working time would enable matters to be set on the road which would lead to a recovery of anything given up at the present time. The miners' leaders at the end of last week, after arriving at their momentous decision, returned to their homes, to wait for something to turn-up. Every hour

the strike continues, the worse becomes the position of the mining industry; and the lower it sinks, the worse will be the state of the miners, and the more drastic the remedy. It is no use the miners' leaders talking of a reduction of the standard of living, starvation, and misery when their policy, which has conduced to overmanning, lower production per man-shift, and increased costs per ton, is one of the main causes for those conditions which they are utilizing for, on the one hand, exciting pity for their constituents, and, on the other, for producing prejudice against the Government. That line of action will not be successful. The public have well in mind the expenditure of £23,000,000; they have before them the report of the Royal Commission, the members of which were purely disinterested and remarkably painstaking, whatever may be the opinions of mining experts as to the feasibility of certain of their proposals; they have in mind the offer of a further £3,000,000 subsidy to help the poor districts to tide over their immediate wage difficulties, while rearrangements are being effected. We are not without sympathy for the miners; but, at the same time, looking at the position from the rational point of view, little hope can be found for maintaining the conditions of the miners, let alone improving them, without co-operative working between them and the owners.

Now the Government are faced with greater perplexity. The owners, in dismissing the Government proposals (which were published in the "Journal" last week) as being unacceptable, say that the conditions which are necessary for progress in the coal industry are freedom from industrial unrest and freedom from political interference. We are all aware that these conditions would be best—the former in any circumstances; the latter in different circumstances. But again it is necessary to examine things as they are. What prospect is there of freedom from unrest in the industry by leaving matters to take their own course? None. As to political interference, this is an instance where we cannot go on perpetually with unrest in the chief of our basic industries; and the Government have stood aside long enough to know that the affairs of the industry and the estrangement between employers and employed have drifted from bad to worse. Without intervention, the same and worse dreary conditions will obtain. The owners and the miners have been in conference and negotiation over and over again; and every time they have had to confess a blank disability to do anything satisfactory to both parties. The General Council of the Trade Union Congress have tried intervention; and their methods at attempting compulsion ended in a most unholy and disastrous mess for the nation and its workers. The only source of authority in intervention is the Government; and now what the Government propose as a basis for negotiation is simply rejected by both sides. The owners declare that the Cabinet suggestions will not be helpful in securing an increased efficiency in the industry, and that a return to the eight-hour day is the only way in which the cost of production can be reduced without involving hardships for certain workmen. To the increase of hours the Miners' Federation are firmly opposed. There can be little question, on the available evidence, that it is increased production per man-shift which is the way to a better economic state. But alongside this proposal the owners also say that, given the eight-hour day, the reductions in wage rates which would then suffice to bridge the remaining gap would not exceed about 10 p.ct. when wages are at the minimum in the worst-placed districts, and even this sacrifice would be more apparent than real, since it would result in fuller employment and higher actual earnings. But here we are back again at July last year; and the owners know that the Miners' Federation are at present resolved not to concede anything in either hours or wages. The reply of the owners to the Government plan was frank, if impolitic. In respect of hours in relation to output, we believe they are right; but the tone and matter composing their reply are anything but diplomatic, conciliatory, or helpful to the Government. It shows a stiffening of the back; and it has probably done more than anything else to reinforce the resolve of the Miners' Federation not to give way in either of the two respects.

It is impossible for the Government to leave things as they are—to leave the two parties to fight out matters from which both are equally determined not to recede in any one particular. It is a grim state of affairs; and at the moment it appears that the country must brace itself up for a prolonged struggle. It is disappointing after all that has been done, and the generosity of the country in providing time for ascertaining ways and means for bringing about happier and more prosperous conditions. Hopes of the country getting farther and farther along the highway to greater prosperity are fast being wrecked. The Miners' Federation particularly are operating with the highest imaginable inefficiency and folly in creating more unemployment in the country, and in causing severe loss and misery to their people, who are losing much more in wages, through that policy, than they are asked to surrender. The owners, on the other hand, have not gone the right way to work, though we admit they have been sorely tried. Now the position is worse than ever. The best thing that could happen would be for the miners to accept the eight-hour day for a period to see whether this would sufficiently mend matters to warrant their continuing it, with better pay circumstances in view, as prosperity comes along. The Federation are anything but constructive; all they do is to say "No, no" to anything and everything that is proposed.

The Prime Minister, the Government, and most people are sick of this attitude. We are therefore glad to see that something in the nature of an ultimatum has been sent to the Federation by the Premier. In it he states that, in the absence of any practicable proposals from them designed to meet the circumstances of the industry, he does not see that any useful purpose would be served by again meeting their representatives, until they are in a position to submit suggestions of the kind required. Furthermore, in view of the growing burden on the national finances caused by the general strike and the present stoppage in the coal industry, it will be impossible for the Government to hold open beyond the end of May the offer of further subsidy for the specific purpose already mentioned. We hope the firmness of the Government will be maintained. The Prime Minister has also chided the owners on their uncompromising attitude, and their inappreciation of the nature of the Government proposals and of the gravity of the present situation. As to "political interference," he has reminded them of the proved incapacity of the industry for settling its own disputes, like other industries. It may be that its conditions are different from those of other industries; all the more reason why the industry requires men of great vision and initiative power. The records of the past and the present position make people wonder whether the industry is at the top equipped with all that is desirable.

Gas Supply during the General Strike.

During the senseless and illegal general strike, while electricity was making a fine contribution on our railways to the transport of the people, gas was silently and efficiently carrying on the equally important duties of heating and cooking in the homes of the community; and such services were the more important in view of the stoppage in the mining industry. The reports which were published in our last issue and those this week furnish evidence of universal success in supplying needs during the critical period. But it is probable that the resources of the industry will be put under much greater strain before there is a settlement of the coal dispute. The gas industry, however, has been under severe and protracted test on previous occasions, and has not been found wanting. We have no fear that its reputation for constancy of supply will not be equally well maintained through the period of coal output cessation if the community will do their part by looking upon the supply as a precious reserve in these days of emergency, and use it—not extravagantly, but with the view of husbanding it as far as possible. While it is the business of gas undertakings to supply labour-saving and smokeless fuel—and in ordinary times they are not nonplussed by any demands made upon them—in emergencies such as the present they require, for greater assurance, the co-operation of the consumers.

Examining the reports which we have received, it is found that they are almost consistent in the statement that supply was, through the general strike, carried on in normal manner, with here and there a slight reduction of pressure, and in some places with calorific value lowered by some 25 to 50 B.Th.U. per c.ft. But this latter condition no doubt applies solely to municipal undertakings

not working on the therm basis of charging. In some industrial centres, there was a reduction of output, owing to the closing-down of works and factories; and in certain cases the diminished income of the slot meter consumers contributed to reduction of demand. There are other cases in which consumers, having been caught short of coal, have been making a larger use of gas for heating and cooking—thus providing some compensation for the diminution occasioned by the stoppage of work at the local industrial establishments. On an occasion of this kind, the value of the gas industry to the general community has an accentuation such as nothing else could supply; and from not a few places, gas engineers and managers inform us that they have received many expressions of satisfaction from consumers that the gas undertakings have been placed in a position to carry on so efficiently. In a time such as this, when the supply of the alternative and main fuel of the country has been entirely cut-off, recognition of the indispensability of gas ascends considerably, in which connection the interesting letter published in the reports last week, under the heading of "Bristol," will have been noted. It was from Dr. D. S. Davis and Dr. R. A. Askins, respectively the Medical Officer of Health and the Deputy Medical Officer for Bristol. In that letter, it was stated that "gas has now become an essential factor in the lives of the great majority of people, and is widely used not only for the purposes of lighting, but particularly for cooking. . . . Deprivation of gas under present conditions practically means deprivation of food"—well-cooked food being highly necessary to the health of the people. While restrictions are being observed as far as possible in regard to gas, a reservation—both official and cautious—has to be placed on the distribution of coke, especially by gas-works with water-gas plants, which have to protect their position in respect of their supply of gas by maintaining a stock of coke in excess of normal requirements. There is no doubt that, if the coal strike continues, there will be a very large demand for coke, a part of which will probably have to remain unsatisfied.

Perhaps one of the most impressive features of the recent experience was the loyalty of gas workers throughout the country. So far as information has reached us, only in one or two small places did those directly concerned in the production of gas leave their employment; and in one of these—unemployment being so rife throughout the country—applications for the positions vacated by the men promptly reached the manager to the number of about five times his requirements. The men who gave up their good and constant jobs are probably now meditating, and not jubilantly, upon their stupid action, particularly as, having thrown themselves out of employment, six weeks must elapse before they will become entitled to the dole. But with these negligible exceptions, gas-works generally can report that, throughout the big strike, they had a full roll of workers concerned in the production of gas, who were faithful, not only to their employers, but to the communities which they help to serve with such an important essential. Our gas workers deserve this acknowledgment. One of our correspondents writes that he thinks the experiences of the fortnight will tend to improve still more the good relations which so largely exist between employers and employed in the gas industry; and from many places where co-partnership principles are in operation, the testimony comes that, in any event, its bonds were shown to be of a very real order. It is true that at some works the men connected with the building trades who were at work upon reconstructions and extensions were called out at the beginning of the crisis; but even these did not in all cases respond to the commands of their unions. Those who did, did so very reluctantly; but in the circumstances the undertakings concerned can look indulgently (although there is no reason why they should do so) upon these defections as not a serious matter. It is sincerely to be hoped that in such cases these men, misled and illegally ordered as they were, will not, through their action, forfeit any co-partnership or superannuation benefits. In a few cases, the transport men employed by gas undertakings were withdrawn; but, in their cases also, gas engineers and managers tell us, there was obvious reluctance to comply with the instructions of the unions.

Largely through this great display of loyalty by both staffs and men throughout the industry gas supply has come out of the ordeal of the general strike with colours flying. But the coal stoppage is still with us. We are glad to learn, from the reports to hand, that, when work was closed down at the pits, gas-works were almost generally fortified to the extent of three or four months' supply of material for gas making on the basis of summer requirements, which show that, now we are clear of the general strike, there is no likelihood, with the help of the consumers, of a failure of supply in any area. One little incident from Stafford may be mentioned. There the Corporation Gas Committee, on the advice of their Gas Engineer, provided well for the great emergency; but the local coal merchants failed to take proper measure of possibilities, and found themselves short of stocks with which to meet local demand. To them the Gas Department have, with the sanction of the Council, been able to release some 500 tons of coal for sale among the inhabitants. Thus, during this period, the Stafford gas undertaking is practically the only fuel supplier in the borough. Is this a presage of the time when gas-works will become normally the centres of fuel distribution for all purposes in every part of the country?

Legislation for Stability and Development.

IN the issue of the "JOURNAL" for May 5 (p. 266), reference was made to the prospect of the National Gas Council drafting, and presenting to the gas industry at an early date, legislative plans for procuring statutory facilities for development, finance, and other matters, to encourage an active policy in the present which will enhance stability and protect the scope for expansion in the future. This is good work; it is work that we have felt for long past is much required; and it is simply taking the long view, instead of circumscribing vision to immediate affairs.

Among the subjects referred to in our previous article was the large and interesting question of amalgamating small concerns with, or supplying them in bulk from, large gas producing works, with the view of eliminating the uneconomy and inefficiency which (through their limitations) abound in the less populous gas supply areas, but which will be the "sites" in the time to come for residential and industrial expansion. We used to hear much about not doing this or that without the assurance of a 10 per cent. return upon the capital expended; and, confessedly, we were prone to think that that was sound administration, and fair to existing consumers. But ideas undergo change and expansion; and many of us now find very good reasons for looking around and ahead. By doing so, there cannot be failure to come to the conclusion that future, as well as present, interests must be protected. A little consideration shows how, in many ways, there can be co-operation for the purpose of improving working in the parts of the industry that specially require it, while at the same time giving the larger undertakings the advantage of increasing their output, so lowering the average per unit of their overhead charges, and providing enlarged business boundaries for the future.

There are, we know only too well, cases in which amalgamations would have come about earlier, had there not been obstacles in the way—obstacles which can be summed-up in the one expression "self-interest." We believe in fair treatment, but fair treatment cuts both ways. There have been schemes of amalgamation which might have gone through, but officers whom it was proposed to dethrone thought they should get more in the way of compensation than was offered; and there have been directors of small undertakings who have been very reluctant, in fact, have declined, to give up the reins of office without receiving substantial reward for making the sacrifice—a reward in excess of what was fair, and perhaps unprecedented in like circumstances. The sacrifice of the interests of a supply area is, it seems, a matter of smaller moment to some men than the sacrifice of their emoluments of office, though consideration for so doing is provided. A grasping attitude must not be allowed to stand in the way of progress in the service of the public. If it does, while we do not favour coercive measures, power ought to be vested (say) in the Board of Trade to deal with any case in which the terms to officers and directors constitute the only matter which stands in the way of an improvement in public service. To the Board of Trade could be entrusted (under general directions agreed by the central body of the industry) the decision as to what would

be just recompense in any given set of circumstances. In some such cases it might perhaps be preferable (as also previously advocated in these columns) to adopt the alternative of a supply in bulk. And not only for the emolument reason. As we all know, many cases exist where the local administration and management of small gas undertakings are well known and influential in their localities. Through bulk purchase of gas from a large undertaking, the small concern could continue its separate existence, and the local management, having no provision of manufacturing plant and materials to occupy attention, could concentrate their efforts on the selling of gas generated more cheaply than they could produce it locally. In the case of small local authority concerns, parochial jealousies often come in, and there is objection to amalgamating for gas supply with large local authorities, owing to the suspicion that that would be the thin edge of the wedge to final absorption of the district for local government purposes. But there again supply in bulk should avert all such suspicions. Relief will no doubt be sought, in the Council's legislative scheme, from the payment of capital duty in cases of amalgamation.

In connection with bulk supply, a flaw has been discovered in already possessed powers. It is the absence of authority to open roads for the laying of pipes outside the statutory limits, to enable bulk supply to be given. In the case of the electricity industry, the Electricity Commissioners have power to grant wayleaves; and the same power for the gas industry should be vested in the Board of Trade. Interlinking authorization is also necessary. To obtain equality with the electricity industry there is likewise the question of realizing power to secure what are called "Fringe Orders," which conditionally would allow undertakings to supply gas to premises outside, but on the borders of, their areas. There is further the simplification of procedure to enable non-statutory concerns to raise themselves to the higher estate of statutory ones.

From this article and the one published on May 5, it will have been seen that there is a large and useful work for the National Gas Council in moving for legislation having for its objects the promotion of the financial stability of the industry, the spread of a higher standard of economy and efficiency in gas supply throughout the country, and the enlargement by amalgamation, bulk supply, and territory extension of the scope of future business development. Without financial stability we cannot have business stability; without economy, efficiency, and territorial possessions, we cannot have the progress which is necessary to our future with active competitors pressing on every side. The long and broad outlook is imperative. The National Gas Council see this; and they know the time has come for new and amended legislative facilities. Procrastination would be fatal to our ambition to consolidate our position in the present for larger future service. The plans of the Council are well in hand; we believe more will be heard of them before long, and that there will be no loss of time in proceeding, consistent with care, thorough exploration, and endorsement by the industry.

Treasury Guarantees for Electricity Loans.

Notwithstanding that the Government believe that their electricity scheme is going to regenerate the country, and therefore—if true—is a matter of almost paramount national importance, no information concerning the position of the Bill was broadcasted during the General Strike; and we had to wait for intelligence until the newspapers were making a shadowy presentation of their former condition. Last Saturday week, the news came that the Government had succeeded, in the House on the previous day, in passing financial resolutions authorizing a Treasury guarantee for loans under the Electricity Bill. The resolution which enabled this to be done also empowered the Standing Committee to consider the clause in detail. The motion was not allowed to go through without challenge or debate, although an amendment, moved by Major Kindersley, that the guarantee should not exceed the sum of £10,000, was not pressed to a division. The necessity for the guarantee, which is tantamount to a subsidy, is a distinct contradiction of the prediction regarding the good results to be derived from the scheme. Furthermore, the electricity industry is in such a healthy state that it can well look after its own financial requirements—the same as its competing industry has to do, and all other communal enterprises in the country. Major Kindersley rightly considers that the statutory powers to be given to the Central Board will provide ample security for any money that will be required. Sir F. Wise is against the taxpayer being made liable for interest amounting to £1,775,000 a year, as well as the capital. In his view, it is a vital necessity that this sort of finance should be stopped, and the sooner the better for the country and the taxpayers. In the opinion of Mr. A. Hopkinson, the giving of the guarantee takes away the safeguard that the members of the Board should be efficient, or take the consequences of inefficiency. The Government were invited by Col. Gretton and Mr. Radford to show that the guarantee is absolutely necessary for their scheme, but we do not see that the Government troubled to do this. It was submitted by Mr. G. Balfour that, if the Bill emerges in the form in which it was presented, the effect will be the payment of a higher price for money to be employed for electrical development.

Every point made in opposition is sound, especially that by Mr. Balfour. In the first place, the Government's guarantee proposal is unjust to the taxpayers and the other industries of the country. Of that there can be no denial. Then the Government guarantee for the money—this is highly important—will cause investors to require a higher rate of interest on their money when capital is issued by the electricity industry which does not carry the Government guarantee. The electricity industry would, in our opinion, be serving its own future interests in the best manner by rejecting at once this financial assistance from the Government. Further, if the scheme does not work out according to the Government programme, and the guarantee has to be satisfied by them, it will unquestionably make it all the more difficult for the electricity industry to finance itself at a reasonable rate in future. Mr. Basil Peto, in supporting the guarantee during the debate, was illogical. He seems to think that the scheme is necessary for the development of the general industry of the country. The effect of the scheme is more likely to be detrimental to industry; and it cannot possibly help the industrial areas an iota more than electricity supply is doing at present in the hands of the competent engineers who are responsible for it, without having superimposed upon them a Board who cannot know, and who are not in touch with, local industrial conditions the same as they are. Mr. Peto cannot advance any proof that the scheme will be beneficial to industry. He only supposes it will; and his supposition is simply based upon Government belief. The same honourable member also remarked that, if there is no necessity for the guarantee, it would not become operative. This means that if the Government belief is not well founded, then there will have to be recourse to the guarantee. The very presence of the guarantee shows that the Government themselves are not perfectly confident as to the success of their plans. To make his illogical submissions complete, Mr. Peto agrees that Government credit is not what it has been, and that the more Government guarantees and loans are piled-up, the worse the credit is likely to be; and yet he thinks it is a policy of despair to do nothing to develop industry with the assistance of the Government. His argument would have more weight if he could give any real assurance that the scheme will develop industry. He appears to overlook the fact that the degrading of Government credit is not beneficial to industry. The best reply the Attorney-General (Sir Douglas Hogg) could make to the criticism of the guarantee proposal is that "it came from the opponents of the Bill. No friends of the Bill endorse the criticism." Of course not.

Counting the Cost.

The Chancellor of the Exchequer does not think the general strike will necessitate the imposition of additional burdens upon the taxpayer; and he does not anticipate that the net direct expenditure by the Government will exceed £750,000. We hope Mr. Churchill is right. But this strike has not occurred without costly effects being left behind; and there are a good many taxpayers who will be sceptical, and will not be

unprepared to see the reflection of those effects in next year's Budget, unless the trade of the country makes a rapid ascent. If it does not—and it will not so long as the coal strike lasts—the revenue which will flow to the Treasury cannot fail to be of decreasing amount. The Right Hon. Walter Runciman, ex-President of the Board of Trade, calculates that (excluding the great power industries) the loss incurred by other industries during the general strike fortnight will not be less than £30,000,000, which is constituted as follows: Coal trade (at the rate of £14,000,000 a month), £7,000,000; railways, £8,000,000; pig iron, £1,250,000; steel £2,500,000; textiles, £5,000,000; chemicals, £500,000; engineering and metal goods, £2,500,000; and other industries, approximately £3,250,000. The diversion of contracts from this to other countries also represents a set-back from which it will take a long time for the country to recover.

Legislation and Strikes.

One natural result of the general strike is the demand for legislation to amend the law relating to trade unions in such a way as to protect the country from the utilization of the organizations for purposes other than those actually affecting the industrial welfare of the members. There are two considerations applying to this demand which must be observed. The first is that it will not do for the Government to mix-up this matter with the dispute in the coal industry. That must be cleared away before embarking upon legislation which will be hotly contested by the trade union leaders. While the two questions must be kept absolutely separate, it will not do to leave the legislative work which the recent strike shows to be imperative until we are out of touch with all that the strike has involved, and all that it implies. Another point is that legislation must be confined to ensuring that the trade unions are kept within the limits of their legitimate functions; and it should be made illegal for any union to declare a strike, in any circumstances, without due notice and a secret ballot of the members. This would appeal to a large number of trade unionists who object to their individual wills being subordinated to the wills of a few men who have worked their way into the position of leaders. It is at the present time illegal to declare a strike in any industry where there is no dispute, unless due notice is given to the employers by the men in accordance with their agreements or conditions of employment. But that is not sufficient—the men themselves should be consulted. The question requires diplomatic handling, and must be thoroughly investigated in all its bearings. The General Council of the Trade Union Congress, in declaring the recent general strike, showed that they did not know what was their legal position; and, in not assuring themselves regarding it, they made an unpardonable blunder. Their hasty retreat, after learning the considered opinion of Sir John Simon, and being faced by the important judgment of Mr. Justice Astbury, was clear proof that they were afraid of the personal consequences of their action. In making their humiliating climb-down, they hoped it would have weight with those who have a right of action against them for damages, and would relieve those whom they misled into placing themselves within reach of the law for breaking their contracts, agreements, and conditions of employment. What has happened in restarting work and reinstating employees does not prejudice any rights which those who have suffered damage possess in respect of actions for recovery. But apart from that question, it is right that strikes should be prohibited, in any union, unless due notice is given to employers, and unless confirmed by a majority of the members on the union register.

Unemployment and the General Strike.

The total number of persons registered at the employment exchanges as unemployed in Great Britain on May 10 was 1,576,000. This was 470,084 more than a week previously, and 391,749 more than a year ago. In addition to these huge totals, claims were made in respect of about 325,000 idle hands in the mining industry on account of the dispute, and about 200,000 persons on strike in other industries. This only forms part of a larger number (the total cannot at present be accurately determined) not at work in the mining industry on account of the dispute or on strike in other industries, none of whom are included in the total of 1,576,000. In the House of Commons the other night, it was stated that there was an increase of some 750,000 in the unemployed returns in the first week of the general stoppage.

Mr. Clynes and the General Strike.

There were many good and philosophical points in the Presidential Address which the Rt. Hon. J. R. Clynes, M.P., delivered at the congress of the National Union of General and Municipal Workers at Bournemouth on Monday; yet in other places there were points which appear to be inconsistent and illogical, and which indicate that Mr. Clynes was trying to drive a middle course between his own convictions and the actions of his "T.U.C." friends. We all know how detestable to him is the national strike policy. He is well aware of its futility and uselessness, of the misery it inflicts, and of the fact that a conflict between the Unions on the one hand and the Government on the other is bound to result in failure for the former. Moreover, he is convinced that economic facts cannot be removed by the simple passing of resolutions by trade unionists, or by their actions. As to the points in which we are in disagreement with Mr. Clynes, he states that the miners were actually locked-out. The miners were not locked-out. What happened was that the coal owners gave, in accordance with the agreements existing in the mining industry, the necessary notice for the termination at the end of April of the agreements then existing, and some of them also posted at their pits the rates of wages which they were prepared to pay, having regard to the lapse of the subsidy, for a continuance of employment. The orders that the men were not to remain at work after April 30 were issued by the Miners' Federation. That is not a lock-out; it is a strike. Then Mr. Clynes asks: "Is a lock-out of a million men in an essential trade to be viewed as legal and proper and to pass without censure, while a strike in a number of trades, begun as an act of retaliation, must be denounced as unconstitutional and revolutionary?" The question introduces a decided weakness into the argument of the President. First of all, the mine owners gave notice in a legal manner of the termination of the agreements. The strike in a number of trades which was ordered by the General Council of the "T.U.C." was without the notices necessary under employment contracts and conditions. That was both dishonourable and illegal. But in the address we find this: "It is idle to say that men who struck work broke agreements and violated contracts." Why is it idle to say that? Is the breaking of a contract or an agreement illegal, or is it not? We hardly think that Mr. Clynes would be prepared to face a cross-examination on his submission in a Court of Law. One other point. The national strike, he states, no doubt involved the workers in the loss of more than £20,000,000 in wages alone. Probably, as Mr. Runciman stated, in addition to this the industries of the country lost £30,000,000 or more in trade, and the direct cost of the strike to the Government was approximately £750,000. Does Mr. Clynes really believe that the "men who struck work committed an act in keeping with the better sides of our British character." If so, we are truly sorry for his estimate of British character.

Spontaneous Combustion of Coal.

"The Oxidation of Pyrites as a Factor in the Spontaneous Combustion of Coal" was discussed at last month's meeting of the Division of Gas and Fuel Chemistry of the American Chemical Society by Messrs. S. H. Li and S. W. Parr, who stated that recent studies on the oxidation of coal seem to prove conclusively that oxidation proceeds very rapidly after a temperature of 70° or 80° C. has been attained, and quickly reaches the autogenous stage of oxidation; while at normal temperatures the oxidation under ordinary conditions is not of sufficient magnitude to generate heat. The question therefore arises as to the source and causes of an initial rise in temperature which is responsible for advancing the mass to the danger point. It is well known that coals which are very low in sulphur content are subject to this initial heating; and it is probable that sulphur is not always the source of difficulty. There still remains the fact that under certain conditions sulphur in the pyritic form may set-up oxidation processes that may account for this initial heating. The studies of the authors proceeded along the line of pyritic sulphur activity from the standpoint of fineness of division, form of crystallization, whether pyrite or marcasite, and the effect of bacterial and catalytic agents which might by any possibility be present in the original coal substance. The most pronounced indication of oxidation was secured in coals that started-out with a high percentage of textural moisture.

PERSONAL.

The vacancy of Engineer at the Ash Road (North and South) Gas-Works, Aldershot, has been filled by the appointment of Mr. Douglas Ritchie, Deputy Gas and Water Engineer and Chief Chemist of the Company, who will take up his duties in the new position on June 1.

Mr. W. J. Liberty, Public Lighting Inspector, City of London, resigned his appointment last month (under the Corporation pension scheme), after nearly 47 years' service; he having reached the retiring age of 65. We wish him good health and much happiness in his new leisure.

Mr. George Haynes, the Superintendent of the Liverpool Gas Company's Athol Street and Eccles Street Works, is retiring after 47½ years' service. He was engaged at Athol Street in 1878, on his leaving the Liverpool College, and was appointed Chief Clerk at Linacre in 1885. Four years later he was transferred to the chemical laboratory at that works. In 1898 Mr. Haynes was promoted to the position of Assistant Superintendent at Linacre, which office he held until 1902, when the Directors appointed him Superintendent of the Caryl Street Works. He became Superintendent of the Athol Street and Eccles Street Works in 1911.

Mr. S. O. Pacey, Works Manager and Assistant Engineer to the Doncaster Corporation Gas Department, has been appointed General Manager to the Gas, Water, and Electricity Departments of the Retford Corporation, where he takes up duty on June 1. Mr. Pacey, who is a native of Doncaster, and has been at the works there for the past five years, began his career at the Doncaster Gas-Works in 1903, and was there until 1909, when he assisted in the start of the Brodsworth Gas Company, and was a year with that undertaking. In 1910 he went to Smyrna as Assistant Engineer to the Ottoman Gas Company; and in 1913 he went to the other side of the world, becoming Manager of the Pernambuco Tramways and Power Company. In 1914 he left Brazil to join the army in England, and later returned to Brazil, but to the city of Santos. In 1921 he went again to Doncaster.

OBITUARY.

Mr. Henry J. Pullman, J.P., whose death we regret to record as having taken place after several months' severe illness, was well known as a gas company administrator A Director since 1900 of the Hampton Court Gas Company, he was elected Chairman on the death of Mr. Alfred Goodman. He had also been Chairman of the Richmond Gas Company for several years before that undertaking was amalgamated with the Brentford Gas Company. In addition, he was a Director of the British Gas Light Company, Ltd., and of the Walton-on-Thames and Weybridge Gas Company. Besides having been a magistrate for over 21 years, Mr. Pullman had been Chairman of the Hampton Wick Urban District Council, and had in other ways taken an active part in public affairs.

Carbon Disulphide in Coal Carbonization.

One of the contributions prepared for presentation at last month's meeting of the Division of Gas and Fuel Chemistry of the American Chemical Society was by Mr. Wilbert J. Huff, who is engaged in the Department of Gas Engineering of the Johns Hopkins University, Baltimore. In this he discussed the bearing which carbon disulphide has upon determining the use of high-sulphur coals for gas making purposes, and then described a laboratory study of carbonizing conditions which produce this compound. The communication appears in full in the April issue of "Industrial and Engineering Chemistry;" and from this it appears that the experiments detailed went to show that carbon disulphide apparently obtained by interaction between the constituents of the gas and the coke, was really derived from the re-heated coke alone. No evidence was obtained in support of the secondary interaction theory. Coal was carbonized without producing detectable quantities of carbon disulphide, when it was heated slowly and allowed to gasify freely. When it was heated so rapidly that a dense, coherent coke resulted from a high-volatile coal, carbon disulphide was found in the products of gasification, though the quantity of coal carbonized was small, and the tarry and gaseous products had only a small amount of space and time contact with carbon. As a possible explanation of this formation, the author pointed out that sulphur is not uniformly disseminated throughout the coal mass. That due to pyrites is, of course, localized. The heterogeneous origin and resulting character of the organic coal substance indicates that this substance must be localized into certain molecules or groups of molecules of higher and lower sulphur content. Heated suddenly, the sulphur and carbon may become active chemically in localities in which a deficiency of hydrogen and carbon may exist, and carbon disulphide may be formed, to be swept rapidly out of the retort by the gas stream. Heated slowly, diffusion may overcome local hydrogen and carbon deficiencies, and the sulphur may combine to form hydrogen sulphide and non-volatile solid carbon-sulphur complexes low in sulphur, rather than carbon disulphide. This explanation is advanced chiefly to illustrate the possibility of devising explanations other than the secondary interaction theory to account for the formation of carbon disulphide.

INSTITUTION OF GAS ENGINEERS.

Annual Meeting, 1926—Postponed from June 8-11.

Programme of Communications.

1. Address of the President (Mr. Chas. F. Botley, M.Inst. C.E.).
2. Annual Report of the Council for the year 1925-26, and Accounts for the year ended Dec. 31, 1925.
3. Report of the Advisory Committee on Education, to be presented by the Chairman, Mr. F. W. Goodenough, C.B.E.
4. Fifteenth Report of the Gas Investigation Committee: "Methods of Testing Products of Combustion from Gas Appliances."
5. Paper on "The Development and Reconstruction of the Portslade (Brighton) Gas-Works," by Mr. C. H. Rutter, of Brighton.
6. Sixteenth Report of the Gas Investigation Committee: "Studies in Carbonization: Part I. Influence of Size of Coal."
7. Paper on "Investigation of some of the Factors affecting Carbonization in Continuous Vertical Retorts," by Mr. T. F. E. Rhead, of Birmingham.
8. Report of the Refractory Materials Joint Committee, to be presented by the Chairman, Mr. J. P. Leather.
9. Paper on "Service to Consumers," by Mr. John W. McLusky, of Glasgow, and Mr. W. B. McLusky, of Halifax.
10. Report of the Institution Gas Research Fellowship, on "The Influence of the Ash Constituents in the Carbonization and Gasification of Coal: Part II.—Gasification of Special Cokes in Steam," by Mr. C. B. Marson, M.Sc., A.I.C. (Gas Research Fellow), and Professor John W. Cobb, C.B.E., B.Sc., F.I.C. (Livesey Professor).
11. Paper on "The Distribution of Gas at High Pressures," by Mr. A. W. Sumner, of Grays.

FORTHCOMING ENGAGEMENTS.

May 28.—North of England Gas Managers' Association.—Annual general meeting at Newcastle.

May 28.—Chemical Engineering Group of the Society of Chemical Industry.—Annual general meeting, Abbey House, Westminster, at 6 p.m.

May 31.—London and Southern District Junior Gas Association.—Annual general meeting at the Westminster Technical Institute.

June 1.—National Gas Council.—Annual general meeting at the Hotel Cecil, Strand, at 3.15 p.m.

June 1.—Meetings of the Central Executive Board of the National Gas Council and the Central Committee of the Federation of Gas Employers will take place in the morning, before the annual general meeting of the Council, instead of on June 8.

June 1.—Illuminating Engineering Society.—Meeting at the Royal Society of Arts.

June 3-4.—Iron and Steel Institute.—Annual meeting at the Institution of Civil Engineers.

June 18.—Southern Association of Gas Engineers and Managers.—Visit to Bristol.

June 21, 22, 23.—Summer meeting of the Institution of Heating and Ventilating Engineers, at Scarborough.

June 23.—Society of British Gas Industries.—Annual general meeting at the Hotel Cecil, under the presidency of the Rt. Hon. Sir Alfred Mond, Bart., M.P. Programme as arranged for May 5.

July 19.—Institution of Chemical Engineers.—Annual meeting.

Sept. 9.—"B.C.G.A.," Midlands District Conference.—Smethwick.

Institution of Gas Engineers.

Annual Meeting and Visit to Hastings (formerly fixed for June 8-10 and June 11 respectively) postponed.

American View of Low-Temperature Carbonization.—When discussing before the Eastern States Gas Conference, held in Philadelphia, the "Past and Present Trend of Development in Gas Manufacture," Mr. J. A. Perry said: Low-temperature carbonization does not promise to be satisfactorily developed. However good it may appear on paper, the large amount of low-grade coke produced will find a difficult and indifferent market, in competition with high-grade coke from our high-temperature carbonization plants. The amount of high-grade oil per ton of coal carbonized on low-temperature plants has been greatly exaggerated. In fact, if low-temperature carbonization were to become universal to-day, the large amount of special and new kinds of tar oils would find, as with the low-temperature coke, a difficult and indifferent market. There will be no economical or commercial trend leading to the adoption or use of low-temperature carbonization plants in the United States.

ELECTRICITY SUPPLY MEMORANDA.

At the time the General Council of the Trade Union Congress made their insane onslaught upon the country, there were many pages of amendments to the Government Electricity Bill awaiting discussion and decision by Standing Committee C. By the time the "T.U.C." had made a humiliating retreat, the list of amendments had undergone further inflation. What, taken together, they all mean we have no notion, and do not intend to waste time in trying to solve the riddle. At the moment, they are infinitely worse than a jig-saw puzzle; and so we shall wait until we can compare with the original draft the Bill, shorn and recast, as it issues from the Committee, to see what has been done towards reformation. During the period that the Press was foolishly silenced, there has been little information published concerning the progress the Committee have been making with their formidable task. But in the House, as will be seen in our editorial columns this week, the Government have secured the passing of a resolution consenting to the Treasury guarantees for the £33,500,000 which, it is estimated, the Central Board will require. There are some considerations affecting those guarantees to which point is given in the editorial article, and over which probably the responsible men of the electricity industry have already been meditating. There is another matter affecting excessive concentration of electricity generation which the general strike has emphasized. The experience in this strike shows the folly of too large concentrations. It may be thought that the recent upheaval and its sudden collapse supply an assurance that a similar adventure will not again be made by the unions. But many things are possible. It was the illegality of this strike, and the fear of actions for damages against leaders and men, that had a large part in its prompt ending. While, as the law at present stands, there can be no massed lightning strikes of the men in different industries, there is nothing against all unionists giving notice to quit their employment, and so arranging matters that notices would expire simultaneously. Large concentrations of electricity supply plant would place in the hands of the fomenters of industrial strife a weapon of incalculable advantage. In the recent strike we saw the value of each railway having generating plant under its own management. This gave the companies, where electrical train services exist, a power to assist the public in, for the time being, a manner which gave great relief—relief which would have been impossible in times past. That is a condition which must be maintained in association with our internal defences. It is of vastly more importance than improving, through the railways, the load factor for the electricity stations. Prudence suggests that it is wise to legislate for the worst possible conditions before their advent, and not to wait until they are upon us. The war taught this outstanding lesson, or should have done so.

The Bill.

Central Board Constitution.

When the Standing Committee who are considering the Government Bill ceased their deliberations on Tuesday of last week until Thursday, they had still under discussion clause 1, which shows that they have a long way to go before they reach the fortieth clause and the schedules attached to the measure. At the sitting, the matter under consideration was the constitution of the Central Board, which appears to have been a very hard nut to crack. Some members have sought to obtain an absolutely neutral body, and require that all sorts of associations should be consulted before appointments are made. Mr. George Balfour would have liked the Lord Chancellor to supersede the Minister of Transport as the person responsible for appointing the Board; but what the Lord Chancellor has to do with the electricity industry, it is difficult to say. However, that suggestion was thrown overboard, just as were many others. The Labour Party, too, desired that two members representing labour should be appointed to the Board by the Minister of Transport after consultation with the Minister of Labour. To that there cannot be the slightest objection, because, although we are not often in agreement with Mr. George Lansbury, we do concur with him in thinking that the people who have to work in such places as generating stations should be represented on a governing authority such as this. As he pointed out, labour is not asking (in a representation of two members) for controlling powers; and, to our mind, it is a perfectly good thing to have on such a body all interests identified with the work of such an organization. However, all discussion on points of this kind was eventually overcome by the Attorney-General (Sir Douglas Hogg) accepting an amendment which was proposed by Sir P. Dawson by which words will be inserted in the clause that the members of the Central Board shall be appointed by the Minister of Transport, after consultation with such of the following interests as he may think fit: Local government, electricity, commerce, industry, transport, and labour. That, however, leaves the Minister with wide discretionary powers. It was suggested that the gas industry should be given a chance to assist and co-operate. Whereupon a complimentary reference to the gas industry was made by Lieut.-Col. W. Ashley, who said he had already had several communications with representatives of the gas industry, and had found them reasonable, and not disinclined to help. As commerce and industry are included in the amendment, this will enable him to consult the gas interests. The Committee on Thursday passed amendments to clause 1 which debar members of the House of Commons becoming members of the Central Board, and any whole time member of the Board (including the Chairman) holding securities in any company or firm supplying electricity or plant required for generation and transmission. Any member who is not required to devote the whole of his time to the duties is to disclose to the Board the nature of his interest, if any, in such business, and shall take no part in any deliberation or decision of the Board relating to any contract with a company in which he is interested. Those are very sound modifications.

Reliability.

In an article by "Invictus," recently published by the "Electrical Review," it is pointed out that the ratio of generating costs to other costs is as 1 : 3. He submits that high efficiency in generation, though important, is not so supreme a consideration for this country as reliability. If reliability is now given the degree of importance it demands, a period will be put to experimenting in the siting of so-called super-stations. Even interconnection, he says, has its limits narrowed down by the two factors of price and reliability. In his examination of the position, the writer places the present cost of a capital steam station at £18 to £20 per KW. of plant capacity. As a substitute for some spare plant, £20 per KW. of cable represents equality. This is reached with a 5000 KW. cable 40 miles long; but its full duty would entail a loss of 10 p.ct. in transmission. Such a cable might save the cost of a certain amount of stand-by plant; but there must be a margin at both ends to enable assistance to be given in emergencies. That is one of the weaknesses in the Government electrical scheme—that so much responsibility is to be thrown upon long lengths of cable; and if real reliability is to be afforded in electricity supply, it follows that the proper place for stand-by plant is at the receiving end (seeing that storage is out of the question), and not at the issuing end. "Invictus" recognizes that it may be said that the cost of an equivalent overhead line would be only half that of a cable. But he asks, Is it not probable that overhead construction for high voltages in this country is foredoomed to early scrapping? For low and medium pressures, overhead construction may be necessary in rural areas; but for other purposes it is described as a "makeshift" and "a pretext of economy." We may quote the writer on the subject of overhead transmission:

> Reliability should not be sacrificed lightly; and it will not be economy to spend much money upon vulnerable, arterial, overhead lines in this country. They are liable to grave interference by lightning, birds, and atmospheric deposits over the insulators, which lead to failure. The insulators also invite pot-shies from the exuberant youth of the districts which such lines would traverse, while maliciously-fired rifle or even catapult shots would play havoc at any moment Further, overhead lines require constant patrol, while their life cannot be expected to equal that of a modern cable laid underground.

All considerations lead "Invictus" to the view that the soundest course for development is to instal modern generating plant, including an ample margin of spares, at or near the load centres, and to interconnect with cables where they will improve reliability, or are desirable from other practical points of view. Though many situations offer advantage to the employment of large generating units, much smaller plants can give efficient results and superior reliability. Modernizing and not scrapping is required where reasonably low generating costs can be realized.

Diversity of Tariffs.

In another column there is acknowledgment of the receipt of the extremely useful "Annual Tables of Electricity Undertakings" published by the "Electrician." The volume has been extended; and this edition includes particulars of some 2000 electricity undertakings in Great Britain, Europe, the Colonies, and other countries. To anyone who requires definite information regarding what is being done by individual electricity undertakings, they will find it in this compilation. Some people derive recreation by delving into statistics of the kind presented here. We have been making a dip here and there into the data to ascertain how things are moving regarding electricity charges. It is found that in some important places the charges are now very much on a line with those that existed before the war; but this does not apply to all the large electricity supply concerns. Certain of them are still making charges for lighting greatly in excess of those which one would have expected would now obtain. But, generally speaking, it is seen that in the industrial areas good service is being rendered in respect of the charges for power supply; and we feel confident that those charges will not be driven further in a downward direction by the Government scheme. On the contrary, fear exists among the responsible

men who now control those concerns that the final outcome of what the Government are doing will be to affect prices adversely. Excluding undertakings in areas in which the conditions are good for obtaining cheap electrical energy, great differences are found ruling between one undertaking and another in lighting and heating and cooking rates, for which no definite reason can be assigned. In respect of lighting, we get undertakings charging 1s. down to 4½d. or 4d.; while instances are found of energy being offered for heating and cooking at 6d., 5d., 4½d., 3d., and 2½d.; while other concerns are selling at 2d., 1½d., 1d., and ¾d. We imagine that those who are offering current for heating at 6d. to 2d. per 3412 B.Th.U. are super-optimistic, or do not want the business, or have no appreciation of the relative values of the means—coal, coke, gas, and electricity—of obtaining heat for domestic purposes. It is also observed that, compared with 1925, there has been a large addition to the undertakings who have introduced the two-part system of charging into their scale of tariffs, although we do not agree with those who base their fixed charge on the rateable value of the premises, inasmuch as it has no relation whatever to the costs incurred in providing the service. In some cases the undertakings have a wonderful range of tariffs. In one instance, we find different charges obtain for lighting dwellings, places of worship, shops, cinemas, and for advertising, illuminated signs, &c.; and these, as well as the varying scale of prices for power according to demand, together with the charges for domestic supply (both lighting and cooking), differing considerably in price according to volume. It is also noticed that the war-time added percentages are dropping-off either through reductions of price or owing to their embodiment in the flat charges now ruling. Another growing feature is provided by the schemes of easy payment terms for the wiring of premises and the hiring of appliances, both domestic and industrial—including motors.

GAS AND COKE SUPPLIES DURING THE GENERAL STRIKE.

Further Experiences.

In last week's "Journal" (see pp. 335-6) there appeared information received from various quarters of the country as to the position of gas and coke supplies during the strike; and this we are now able to supplement with accounts of a similarly gratifying character from other towns.

Bath.—Mr. J. Wesley Whimster (Engineer and Manager of the Bath Gas Light and Coke Company) writes: "We were very fortunate in having practically no difficulty whatever during the progress of the strike, as our men remained loyal, and not a single man went out. Of course, owing to the coal strike, we have of necessity to economize our coal stocks as much as possible, by increasing our percentage of water gas, which with us is not an altogether economical proposition. Strange to say, there has been no increased demand for coke locally, which rather points to the fact that, in view of the experience during the last coal strike, people, in anticipating the present strike, have laid in a stock."

Blackburn.—From Mr. G. P. Mitchell (the Engineer and General Manager) we learn that the Blackburn Corporation Gas Department were not in any way inconvenienced by the strike, further than by having to resort to road transport for supplies of oil for the carburetted water gas plant and acid for the sulphate plant.

Burnley.—Mr. J. H. Clegg (the Engineer and Manager of the Burnley Corporation Gas Department) writes: "The Burnley Gas-Works have been able to carry through the period of the strike uninterruptedly with full supplies of gas and coke, and with little discomfort. The stock of coal used normally at this period of the year would have lasted three months; but by fully employing our carburetted water gas plant, we could have held out six months. Immediately upon commencing the strike, our transport men, steam and petrol drivers, ceased work, and the following day our retort setters ceased work. The carters who happen to be members of the Gasworkers' Union were also stopped on the Thursday morning of the first week, and on the first Saturday strenuous efforts were made by the Local Strike Committee to bring out the whole of our men, and it was due to the resistance of the Local Union Secretary, acting upon instructions, that these efforts did not avail. All our men recommenced work immediately upon the conclusion of the strike. Coal supplies are not yet forthcoming with the exception of a small quantity taken from pithead stocks at one of our local collieries, which is delivered by canal. The reduction in coke stocks is the one pleasing effect of the crisis."

Darlington.—The whole of the employees of the Darlington Gas Department who are members of the National Union of General and Municipal Workers, numbering about 150, remained at work during the general strike; and Mr. A. E. Ruffhead (the Engineer and Manager) is of the opinion that the large majority were most anxious to do so. On Saturday, the 8th inst., however, the motor lorry and delivery van drivers and the locomotive driver, who are members of the Transport and General Workers' Union, left their employment without notice; and threats of a general stoppage were made when it was attempted, by other means, to deal with the delivery of gas appliances and coke in the town and the necessary transport of coke in the yard. In spite of these threats, all difficulties were eventually overcome, and the whole of the activities, apart from coke delivery, of the Department, were carried on with the usual staff of men until the end of the general strike. It was then apparent that there was work only for some of the Transport Union men, due to coal traffic being stopped, shortage of gasfitting orders, and orders for delivery of coke having been placed elsewhere. But the men on strike refused to return unless work was found for all; and it was not until Monday, the 17th inst., that they returned to work on the Gas Committee's terms. All were found employment, but some only as labourers in the yard until such time as they might be required for their own work. The Department are fortunate in having a fairly large stock of coal, and calculate that they will be able to continue without further supplies for at least twelve weeks from the commencement of the coal strike. There is also a good stock of coke which, owing to the fact that the Department have no water gas plant, is available for sale as far as is allowable under the Coal (Emergency) Directions of the Board of Trade.

Derby.—Mr. J. Ferguson Bell (the General Manager and Engineer of the Derby Gas Light and Coke Company) writes: "All our men remained loyal excepting a few engaged on building work, who, much against their wish, were ordered out by the Building Trades Union. An effort was made to bring out our transport workers; but after a meeting with me, they unanimously decided to continue their work. The Company had happily good reserves of coal in stock; and we carried on as usual. In consequence of several of the large works being closed, and owing to the Coal (Emergency) Directions, there is a decrease of about 11 p.ct. in the output of gas for the fortnight. We are taking advantage of the shortage of house coal to push the sale of gas coke for domestic purposes. The men on strike in Derby and district are to be commended for the admirable manner in which they conducted themselves, during what to many must have been a very trying period. They are glad to get back to work; and it is up to all employers to forget the past, look forward to the future, and do everything possible to mitigate the sufferings caused by this deplorable general strike, which happily is now a thing of the past, and which we all devoutly hope will never again be attempted."

Glasgow.—Mr. John W. McLusky (the Engineer and General Manager of the Glasgow Corporation Gas Department) writes: "When one considers the magnitude and far-reaching effects of such a calamity as overtook the general industry of the nation on Tuesday, the 4th inst., one can only express the deepest gratitude and relief that the gas industry was not included directly in the disaster. The stocks of coal held in the Department's four works when the strike commenced totalled 120,000 tons, equal to a normal summer demand of thirteen weeks. The domestic coal merchants of the city evidently did not anticipate a prolonged stoppage, for they only held stocks amounting to fourteen days' normal demand. The employees of the Department gave no sign whatever regarding their attitude towards the general strike; and the impression made was that they were very pleased to attend to their daily duties. On the distribution side, activities were confined to ordinary domestic fitting work and the maintenance scheme." Further reference to the strike period in Glasgow will be found in our news columns to-day.

Halifax.—The sale of gas by the Halifax Corporation Gas Department for the fortnight covering the strike period was only 0·9 p.ct. less than for the corresponding period of last year. Somewhat less gas was required for industrial purposes, owing to the dislocation of trade and the restrictions imposed by the Emergency Powers Act. Otherwise, says Mr. W. B. McLusky (the Engineer and Manager), the manufacture and distribution of gas proceeded without the slightest interruption. Every man—gas workers and craft tradesman—worked full time as usual.

Harrogate.—During the general strike no trouble was experienced by the Harrogate Gas Company with their men, who have given assurance that they will not take precipitate action. Mr. Frank H. Robinson (the Engineer and Manager) says the Company have good stocks of coal and coke, and that the people of Harrogate are becoming more and more dependent upon the gas-works for fuel during the stoppage in the coal industry.

Huddersfield.—The only employees of the Huddesfield Corporation Gas Department who were affected by the general strike were bricklayers, who were out for a week, and plumbers, who were out only three days. Otherwise, Mr. Harold Singleton (the Engineer and Manager) tells us, everything went perfectly smoothly.

HULL.—Mr. Harold E. Copp (the Engineer and Manager of the Hull Station of the British Gas Light Company, Ltd.) writes: "The outstanding feature so far as this station is concerned was the admirable behaviour of all our men, and the spontaneous offer to assist in every possible way by each member of the staff. The position was one of considerable anxiety, as the area of the Company's property at Sculcoates is over 44 acres, and the works might have been entered at several points. In view of the facts that many thousands of tons of coal are stored in a field, and that there are a large number of tanks containing inflammable liquids at our tar works, it was necessary to organize carefully a number of men to act as guards at night. These were replaced during the second week of the strike by a large force of Civil Constabulary Reserves. I have not heard that any of our men were interfered with; and the Company's vehicles ran as usual throughout the strike."

LINCOLN.—From Mr. W. H. Mainwaring, Manager of the Lincoln Corporation Gas-Works, we learn that, when the general strike was declared, an Emergency Committee decided to maintain the public services to as full an extent as possible. The proprietors of the "Lincolnshire Echo," which is a Conservative organ, intended to issue a small paper on Monday, May 10. When this became known, however, Councillors Deer and Rayment visited the Gas Offices, and informed the management that, unless this arrangement was stopped by refusing to supply gas to the "Lincolnshire Echo," the gas workers would be called out, and the supplies of gas would be stopped entirely. The evil effects of such a course were pointed out to these Councillors, who, however, persisted in their attitude. In consequence of this the "Echo" thought it best, in the interests of the community, not to publish on May 10, but on the 12th inst., after the Emergency Committee had declared that they would not sacrifice the well-being of the whole community because of the anti-social threat of a small number. Fortunately, on the day when the paper was to have been issued with the aid of gas, the general strike was called off, and emergency measures were not necessary.

MORECAMBE.—During the strike the Morecambe special constables included thirteen employees at the Corporation gas-works. They were enrolled on the distinct understanding that their services in a constabulary sense would be called for only in protection of the gas-works against danger. All members of the gas-works staff remained loyal; and in order to do so, those who were members of a trade union requiring them to strike resigned their membership.

OLDHAM.—As they had from twelve to fourteen weeks' stock of coal when the strike started, the Oldham Corporation Gas Department did not, Mr. T. Duxbury (the Engineer and Manager) informs us, feel the slightest pinch so far as coal shortage was concerned. The stoppage in transport interfered a little with the disposal of tar from one of the works; but this was overcome by pumping a small quantity of tar into a disused gasholder tank. There is one disused gasholder tank on each of the three works; and had the transport strike lasted, the Department could have stored their tar and liquor for six months. The fitters and mechanics did not come out.

SIDMOUTH.—The Sidmouth Urban Council have decided to engage a new staff for the gas-works, to replace the employees who went on strike. The vacancies were temporarily filled with other employees—road men, &c. A resolution was passed at the time that if the men returned to work on a given day they would be reinstated; but only four members returned and commenced work. The Council advertised for stokers and labourers, and there were about seventy applications for the thirteen positions. The Council instructed the Manager to engage a staff out of the applicants, all of whom will be new employees, with the exception of one man, who was ill at the time of the strike.

SOUTH SHIELDS.—From Mr. Dugald Currie (the Engineer and General Manager) we learn that the upheaval made little or no difference to the South Shields Gas Company in the carrying out of their ordinary routine work. All the employees, without exception, remained at their posts; and the Company's transport department was allowed to function without interference of any kind.

STOCKPORT.—Mr. S. Meunier (the Engineer and Manager of the Stockport Corporation Gas-Works) writes: "We were only affected very slightly by the strike, and that was in connection with our transport. The drivers all stopped on the Wednesday morning; but by the Friday two were sent back to us, and a third on the Saturday. On the Monday following, the union sent in a fourth; but the remainder we did not put on until Wednesday, the 12th inst., after the union officials had negotiated with us. Our engineers and meter repairers were instructed to come out, but did not do so; and none of our other men were affected in the slightest degree."

WALLASEY.—With the exception of working coal from stock, no difficulty was experienced by the Wallesey Gas Department. Mr. J. H. Crowther (the Engineer and Manager) says all men carried on as usual.

HEAT TRANSFER AND EVAPORATION.*

Reviewed by Dr. W. B. DAVIDSON.

The literature on this rather difficult subject is still very limited, at any rate in book form, and one feels inclined to welcome a new treatise even at a time when there is somewhat of a deluge of new treatises on allied scientific and technical matters.

Hausbrand's work on "Evaporating, Condensing, and Cooling" has for long occupied a premier place in the reference library of those who are interested in chemical engineering of this character; and in spite of the excellence of the volume under review, it is thought that the older book will still commend itself to the majority of practical men.

Mr. W. L. Badger, who is Professor of Chemical Engineering at Michigan University, devotes the first half-dozen chapters of his book to the study of heat transfer in all its phases. These sixty pages are said to have taken three years to write. Each of the three methods of heat transmission—conduction, convection, and radiation—takes up a chapter in the early part of the book, and is discussed in detail. References and tables are supplied, and problems in heat transfer through tube walls and temperature drop across heating films are worked out. Thermal conductivity of gases and liquids (water principally) is shown to be of little account practically, radiation and convection being the principal factors which count in their case.

The laws and constants of radiation, it is made clear, are difficult to apply quantitatively to actual problems in design, though the principles may be interpreted qualitatively, and serve as valuable guides. The "angle of vision" is one great uncertainty, and the "blackness" of the surfaces involved is another. Some data on the thermal conductivity of such solids as coal and coke would have been welcome, and recent work on this subject by English chemists might have been incorporated with advantage in the tables of constants.

One of the most interesting and useful chapters is that dealing with heat transfer between solids and gases, in connection with which the results of a number of investigations based on Reynolds' fundamental work are graphed and discussed. An application of the figures to actual water cooler design is given, but even yet our knowledge of all the basic factors governing heat interchange between gases and solids is small. This remark applies also to heat transfer between solids and liquids; and all attempts to correlate available experimental work have failed to yield any simple numerical relation. One of the difficulties has been the determination of film resistances, involving as it does the measuring of tube wall temperatures.

The great bulk of the book is devoted to the subject of evaporation. Heater design is carefully studied, details of construction are illustrated, and problems relating to coefficients of heat transfer and heating area are worked out. The author is obviously at home on the subject of multiple-effect evaporators, which are described at considerable length. It is to be regretted that several diagrams (pp. 94, 125) are lettered, but not explained in the text. One (p. 106) is explained by letters which are not given in the illustration, and several are neither explained nor lettered. The matter appears to be fairly complete. Many American evaporators are described, and a few English ones, including the Kestner climbing-film type.

In following-up with the theory of multiple-effect evaporators, Hausbrand's type of diagram is followed with slight modifications which are, however, questionable improvements. Details of a practical character of multiple-effect operation, including scaling, entrainment separators, and methods of feeding, are most valuable, as also is the chapter on evaporator auxiliaries, which, however, is rather short.

The notes on evaporators as applied to specific industries (beet and cane sugar, salt, paper pulp, soap, glue, and gelatine) might with advantage have been greatly extended, and have included examples from the industry of fine chemicals.

The final chapter on costs is of general interest, but is too sketchy and discursive to be of much practical value. One expected fairly definite figures for capital and operating costs of important processes, such as that of a multiple-effect evaporating plant in (say) the sugar industry, or other large industries.

The diagrams, 113 in number, throughout the book are characterized by clearness, and are not too elaborate. Patent references throughout appear to be fairly complete; American patents, of course, predominating.

The book is typically American in some of its phrasing, and does not gain in clearness on that account from an English point of view. What is meant exactly, for example, by the "master mechanic's crew"?

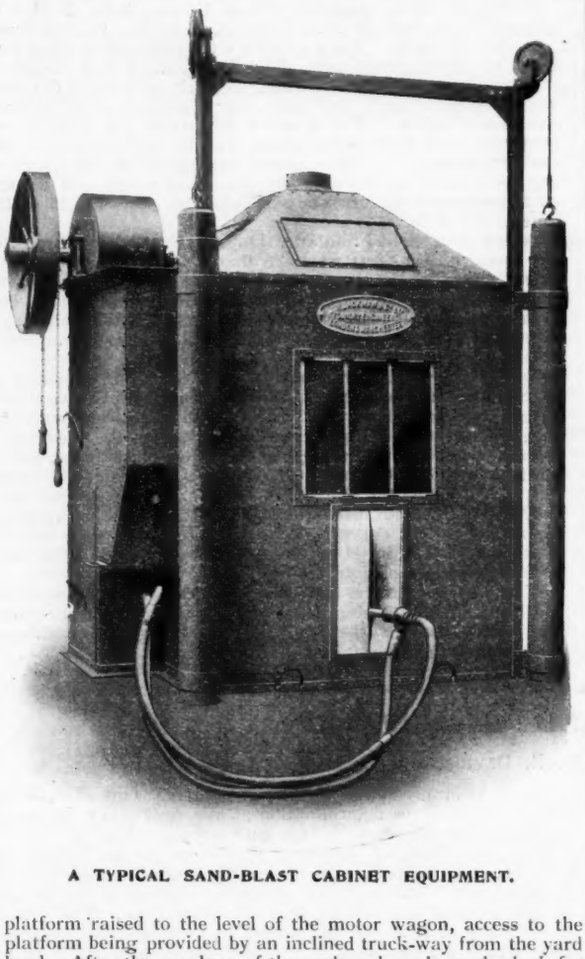
We think the book may certainly be regarded as a welcome addition to our limited store of information on a rather abstruse subject, and our thanks are due to the author for the great pains he has taken in compiling 300 pages of valuable reading matter.

* "Heat Transfer and Evaporation," by W. L. Badger. Published by the Chemical Catalog Company, New York, 1926.

INCINERATION AND SAND BLAST FOR CLEANING COOKERS AND COOKER PARTS.

The use of incineration and sand blast for the cleaning of gas cookers and gas cooker parts is becoming more and more the general practice, and a recent installation at the works of the Liverpool Gas Company will be interesting to our readers.

On arrival at the repair shop the cookers are unloaded at a



A TYPICAL SAND-BLAST CABINET EQUIPMENT.

platform raised to the level of the motor wagon, access to the platform being provided by an inclined truck-way from the yard level. After the numbers of the cookers have been checked, for office purposes, the cookers are trucked to a shed, where the tap rails, enamelled crown plates, and wooden handles are removed. The door of each cooker is lifted off its hinges and placed on the hotplate, resting inside the cornice top in such a manner that it will not slip when the cooker is removed. The fittings are placed inside the oven, thus ensuring that they will be heated to the same temperature as the cooker. The latter is now placed in a convenient position near to the incinerator. The process of incineration is carried out on twelve cookers at a time. When all is ready, the door of the incinerator is raised, and the cookers are wheeled into the hot chamber by means of a truck specially designed for the purpose (fig. 1). The truck is so arranged that the operator can raise the cooker from the ground, and wheel it to the allotted place—a necessary convenience, as the temperature reaches 650° Fahr. The incinerator, which is coke fired, was supplied and erected by Messrs. Drakes, Ltd., of Halifax, and is a brick chamber 7 ft. 9 in. by 8 ft. by 7 ft. high. The roof is arched, and the side walls are held by rolled-steel buckstays and tie-rods. The door is built of wrought-iron plates strengthened by 2 in. square solid iron bars inside, and 2 in. angles outside. The cavity between the plates is filled with non-conducting material. This counterbalanced door, weighing about 13 cwt., slides vertically in guides consisting of two rolled-steel joists, allowing free movement when rising and falling; but, when closed, four cam levers are brought into action, and the door is forced against the chamber side joists. The floor, which is of firebrick, is fitted with a channel into which the door falls, and is sealed with sand. The furnace is direct fired, and combustion chambers placed on each side of the furnace convey the hot gases to a series of nostril holes on the left side of the chamber. When the door is closed, the hot gases rise on the left side and sweep over the cookers, leaving the chamber through similar nostril holes on the right side into the flue. The heat of the waste gases is utilized for heating a caustic soda tank placed directly over the flue, in which small fittings are washed. The cookers are left in the chamber for approximately five hours, and are then removed by the special truck. Despite the fact that the cookers are almost red-hot, no inconvenience is experienced in the handling of them, and they are wheeled directly from the incinerator to the blast room, which is in close proximity.

To those not familiar with the process, it may be stated that sand blasting consists of impelling an abrasive material, usually coarse quartz sand or fine steel shot, under pressure on to the articles to be treated. The result is to remove completely all rust and scale, and to give a thoroughly cleaned surface. Compressed air up to 30 lbs. pressure per sq. in. is the impelling medium. The plant at Liverpool is of the type known as the suction system, in which the stream of compressed air is brought to the mixing chamber of the nozzle, induces a steady flow of abrasive from the storage hopper, and discharges it at high velocity through the nozzle tip.

To reduce wear and tear, air and abrasive material pass along separate hose pipes, and only meet in the mixing chamber, to which is fitted, by means of a screwed gland, the nozzle tip. Within the mixing chamber is fixed an air regulator nipple made of specially hard tool steel, through which the air under pressure passes before meeting the abrasive. This ensures a constant air delivery independent of the wear of the nozzle tip,

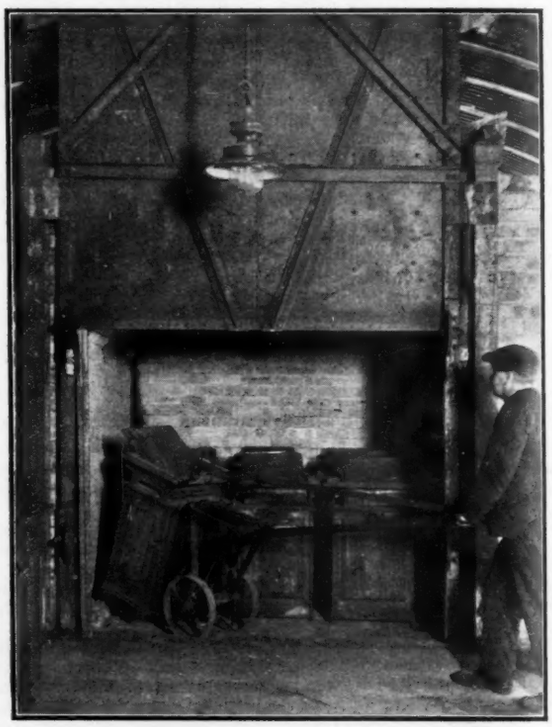


Fig. 1.—Incinerating Chamber, showing Cookers being Placed in Position (Liverpool Gas Company).

and confines the wear and tear to that only, which can be readily and cheaply renewed.

The stoves are brought into the cabinet one at a time. When blasting, the operator stands or sits outside throughout the operation, and holds the nozzle so that it projects through a slitted opening in a rubber curtain fitted in the counterbalanced door (fig. 2).

The stove rests on a power-operated turntable in the floor of the cabinet, the movement of the turntable being controlled by a foot pedal located conveniently outside the cabinet. With this arrangement the operator does not require to touch the stove when once it is placed on the turntable, as its various surfaces come opposite the nozzle as the turntable revolves.

The floor of the cabinet is made up of cast-iron grids, and the abrasive material falls through the grids, and through a sieve below, on to a worm conveyor screw. By this means the abrasive material is taken to the foot of the bucket elevator, thence to a cleaner, and on to the storage hopper for use again. To secure a uniform flow of abrasive from the hopper without operating any sand valve, a patent self-sealing device is fitted to the base of the storage hopper, through which the abrasive passes to the hose, but only when the air is on. Thus complete control of the blasting operation is effected by a small lever gate valve fixed near the sand blast nozzle.

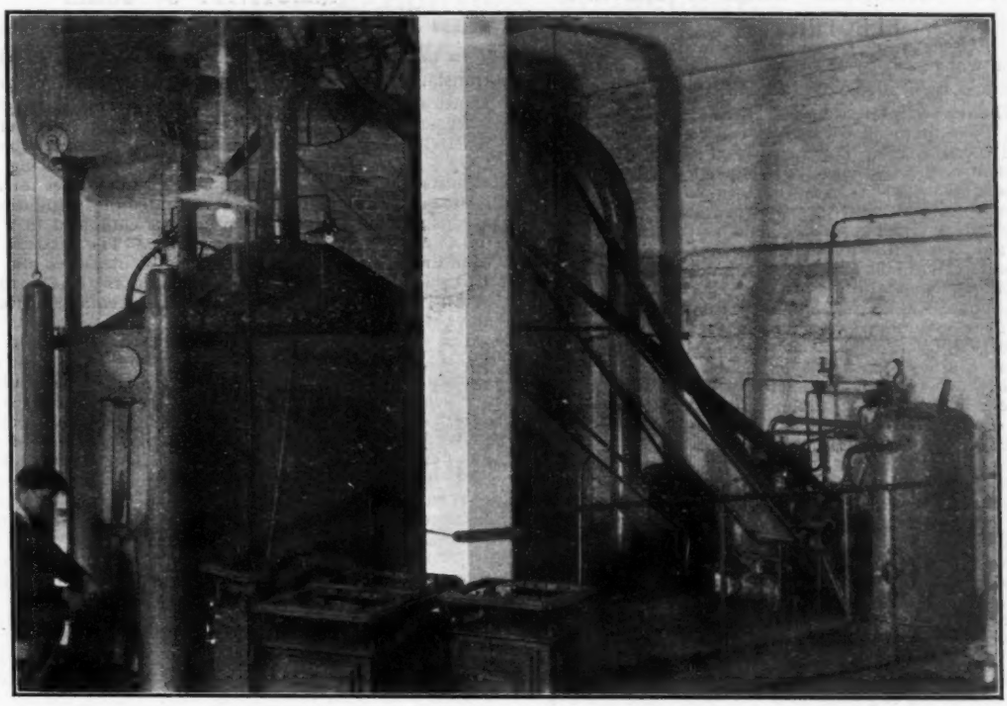


FIG. 2.—VIEW OF SAND-BLASTING PLANT, SHOWING OPERATOR AT WORK.

Dust, as formed, is exhausted through openings in the top of the cabinet, and conveyed to a dust collector and separator by means of a belt-driven fan.

The outstanding features of the plant are its simplicity; the great advantage of the operator being fully protected, for he never enters the cabinet while sand blasting; and the dust exhaust system. Only 40 c.ft. of free air per minute, absorbing about 5 H.P., are required to operate the sand blast process.

The plant at Liverpool will easily handle 25 cookers and parts per day, one man only being employed. It is complete with belt-driven air compressor and receiver. Messrs. J. W. Jackman & Co., Ltd., Vulcan Works, Manchester, are the manufacturers, and specialize in this class of equipment.

After the operation of sand-blasting, the cookers are removed to the repair shop (fig. 3), where the cast-iron crown plate is removed, and the cast dome inside the crown is thoroughly cleaned with a wire brush. All inaccessible parts are painted before re-assembling. The gas taps are ground in and polished before replacement, and cookers requiring linings are fitted with patent "slip-in" linings which have been designed specially for the Company's hire cookers, and can be fitted in five minutes. The two side linings lock into position behind the door frame, and are held there by the back lining, which in turn is held in position by means of a small iron clip at the base of the back frame. It has been found necessary to give the cookers two coats of paint after the blasting process. Glazing and polishing, when necessary, are done in an adjoining shop.

Undoubtedly the system is a big advance as regards the cleaning effected, time taken, and working cost, compared with hand cleaning and pickling.

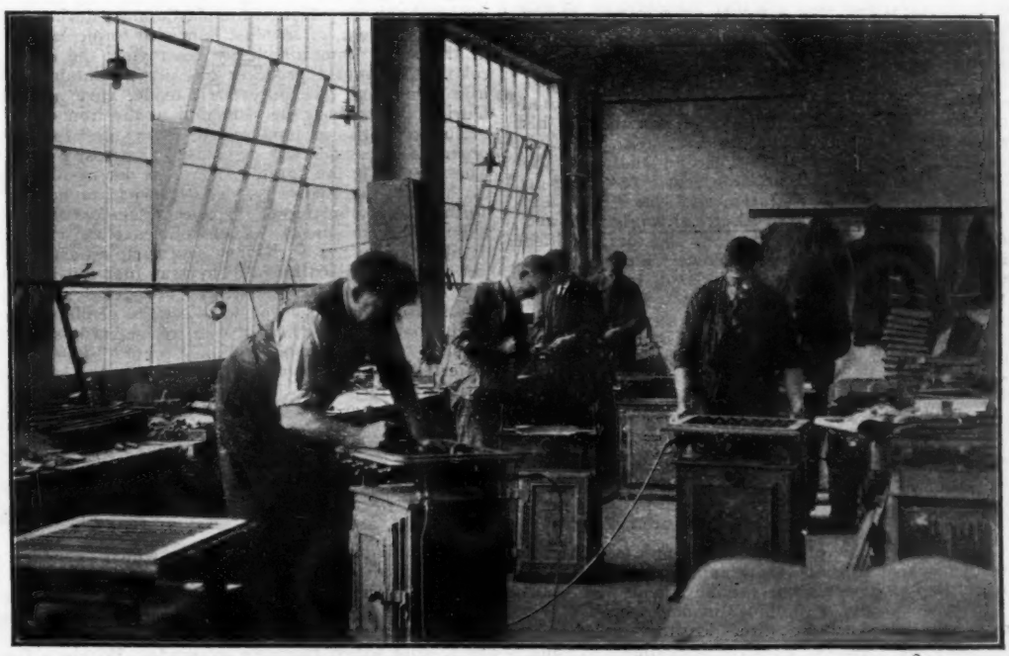


FIG. 3.—PART VIEW OF COOKER REPAIRING AND ASSEMBLING SHOP.

RELATIVE THERMAL VALUE OF GAS AND ELECTRICITY.*

A volume which will be of the utmost value to the gas industry has just been published by the Institution of Gas Engineers. The title is "The Relative Thermal Value of Gas and Electricity," and the book consists of collected papers, &c., by Sir Dugald Clerk, K.B.E., D.Sc., LL.D., F.R.S., M.Inst.C.E., Past President of the Institution. It is particularly valuable in that it treats of a subject of first-rate importance to the gas industry—indeed, to all who are concerned about the conservation of the nation's fuel resources—and in that the matter is based on the best authority and the most thorough study. In a preface to the publication, Sir Dugald Clerk states that the Council of the Institution of Gas Engineers thought it desirable to publish in one volume papers and addresses which were read in the years 1919 and 1920 before the Royal Society of Arts, the Institution of Civil Engineers, and the Institution of Electrical Engineers; and he expresses the hope that the volume will prove valuable to members of the gas industry and to others interested in questions of absolute and relative efficiencies of gas and electricity in public use. There can be no doubt about the fulfilment of this hope.

The first paper in the book is that on the "Distribution of Heat, Light, and Motive Power by Gas and Electricity," which was read by Sir Dugald in 1919 before the Royal Society of Arts. The discussion on this, which is a reprint of that which was given in the "Journal" for March 25, 1919, is included. Then follows the classical Report on the Coal Gas and Electricity Supply Industries of the United Kingdom, presented to the Institution of Gas Engineers in 1919 by Sir Dugald Clerk and Profs. Smithells and Cobb. Respecting this report there is much of interest in Sir Dugald's preface. He mentions that during the six years 1919-24 improvements were made in both the gas and the electrical industries which have increased the thermal efficiencies of production. The Gas Light and Coke Company and the South Metropolitan Gas Company carbonized during 1924 about 3½ million tons of coal—approximately 20 p.ct. of all the coal carbonized in the United Kingdom. In the case of the former Company, the thermal efficiency of gas production was 53·2 p.ct., and that of production and distribution 50 p.ct. The corresponding figures for the latter Company were 52 and 50·5 p.ct. The results are practically the same, and show a substantial improvement upon the value found in the Clerk-Smithells-Cobb report, which is, for production and distribution, 44·4 p.ct. Sir Dugald estimates the average production and distribution efficiency throughout the country as 50 p.ct. Similar improvements have been effected in the electrical industry. In the year ended March 31, 1918, the average of electrical generation and distribution in Britain was 7·6 p.ct. In the return for 1924 it was 10·4 p.ct. The best efficiency of any single generating station in 1918 was 16·25 p.ct., and in 1924 20·33 p.ct. A thermal efficiency of gas production of 75 p.ct. has not yet been obtained, but 68 p.ct. has been reached in an investigation at Uddingston with Glover-West vertical retorts with moderate steaming. A vertical retort installation with waste-heat boilers of the Gas Light and Coke Company during six months' working (January to June, 1924) has shown a thermal efficiency of gas production of 67 p.ct.; while at Harrogate 68·5 p.ct. has been obtained, and at Vienna 68·5 p.ct. also.

Following the report comes an article entitled a "Note on the Thermal Efficiencies of Production, Distribution, and Use of Gas and Electricity," which Sir Dugald Clerk contributed to the "Journal" for February 10, 1920. Then there is his James Forrest Lecture read before the Institution of Civil Engineers in 1920, followed by his Presidential Address to the Institution of Gas Engineers in the same year. A "Note on the Thermal Efficiency of the Generation and Use of Gas and Electricity" (before the Institution of Electrical Engineers), and a contribution to the "Journal" for Jan. 26, 1921, entitled "The Heat Unit Basis in Relation to Power Supply" complete the collection of papers. The remainder of this excellent volume is taken up by the Gas Regulation Act, the Report of the Board of Trade Departmental Committee on Carbon Monoxide (July 1, 1921), and the Report of the Board of Trade Departmental Committee on Incombustibles (Aug. 12, 1921).

* "The Relative Thermal Value of Gas and Electricity," Collected Papers, &c., by Sir Dugald Clerk. Published by the Institution of Gas Engineers.

REACTIVITY OF COKE.

Method of Determination, and Factors Influencing this Property.

In the March issue of "Fuel in Science and Practice" is a translation of an article by J. P. Arend and J. Wagner which appeared in the "Revue de Metallurgie," 1924, 21, 585, on the "Reactivity of Coke." The authors base their definition of reactivity on the law of equilibrium of the reversible reaction $CO_2 + C = 2CO$; and their method of measuring reactivity consists essentially of plotting equilibrium curves for absolutely identical conditions of passage of a definite volume of CO_2, at a constant rate, over a lump of coke contained in a porcelain tube heated to a known temperature. The mixture resulting from the partial reduction of the CO_2 is measured and analyzed. The reactivity at the definite temperature is given as the amount of CO_2 transformed, expressed as a percentage of that originally present.

The method of working is as follows: The coke to be examined, cut into the form of a cylinder, 100 mm. long and 30 mm. in diameter, is placed in a porcelain tube heated uniformly throughout the length of the coke by an electric furnace. A tight kaolin joint surrounding the coke compels the gas to pass exclusively through the whole length of the coke. The flow of gas (500 c.c. per minute) being constant for all the tests, the time of contact is identical in all experiments. The total amount of CO_2 used is 10 litres. During the first half of the tests, the products of the reaction pass into the atmosphere; they serve merely to rinse out the apparatus. The measurement of the reactivity is not started until equilibrium is completely established. To prevent the stagnation of the gases formed in the neighbourhood of the coke, the empty parts of the tube are packed with porcelain rods, leaving only narrow passages for the gas.

From the results of experiments carried out in this apparatus, the authors conclude that, for cokes from the same coalfield, as well as for cokes of different origins, the reactivity increases with the porosity, and that, for cokes of the same porosity, but from different coalfields, the difference of reactivity may amount to 15 p.ct. This difference, they say, is to be attributed to the activity—*i.e.*, the molecular structure of the carbon.

Factors Modifying Reactivity.

If the most rapid evolution of the volatile matter occurs at the beginning of the softening of the coal, the mass subsequently shrinks, and gives a compact coke. The contrary happens if the maximum evolution of the volatile matter occurs when the coal, having softened by heat, begins to harden again. The porosity, and consequently the reactivity, therefore depends on the temperature at which the molecular changes giving rise to the maximum gas evolution take place. As to the influence of the rate of heating on reactivity, experiments showed that slow heating gives a strong, compact, and feebly reactive coke. Rapid heating puffs out the coal while it is in a plastic state. The addition of sawdust and tar to the coal before carbonization causes an appreciable diminution in the strength of the coke, while ammonium carbonate does not produce any change. All these substances decompose at low temperatures, and the extra gas evolution they cause ceases too soon to have any effect on the plastic mass during solidification. Twenty per cent. of sawdust is needed to increase the porosity, at the same time completely destroying the cohesion of the coke. Ash from a producer gas plant, containing 15 p.ct. of iron oxide, and also pure ferric oxide, gave a marked effect. During the coking, the reduction of the iron oxide causes an evolution of gas at temperatures from 600° to 700° C. This produces a considerable increase in porosity and reactivity. The increase in the latter, however, is not wholly accounted for by the increase in porosity. The reduced iron acts as a catalyst during the combustion of the coke by carbon dioxide.

To the same issue of "Fuel in Science and Practice," Ralph A. Sherman and S. P. Kinney contribute an article on the subject of coke combustibility. They say that consideration of certain experimental results which they detail shows that those factors commonly believed to affect the combustibility of coke in air—namely, character of coal, coking process, coking time, density, porosity, and volatile content—have no apparent material relation to the combustibility as measured in an experimental furnace or in the blast furnace hearth. The only factor which has any appreciable effect on the combustibility is that of size.

Simple Gas Tester.—The Dr. Otto-Lux gas tester is a simple instrument which will indicate promptly changes in gas caused by variation in composition, specific gravity, or heating value. In other words, it combines in one operation the information usually obtained by three lengthy processes—namely, gas analysis, specific gravity determination, and calorific value reading—though it is not intended to replace any of these tests where exact results are required. It consists of a bunsen type burner, to which is added a simple mechanism to regulate accurately the primary air. The pressure of the gas is standardized to 1½ in. by means of a pressure scale. A pointer is used to operate the air shutter; and this pointer rests on a graduated disc, subdivided into 100 equal parts, from which readings are made. Within a few minutes it can be ascertained whether any change has taken place when standard readings are compared with present readings.

GAS EXHIBITION AT DUDLEY.

There was an attendance numbering several thousands during the week of a recent exhibition under the auspices of the Town of Dudley Gas Light Company; but, successful though it was from a business point of view, there is no doubt it would have been even more so, had it not been that the general strike was effective at the same time. Cookery lectures and demonstrations daily, by Miss H. H. Tuxford, M.C.A., were crowded.

Presiding at the opening ceremony, Mr. C. E. Lloyd, Member of Parliament for the Borough, congratulated the Company upon the progressive spirit manifested by the organization of the exhibition, and expressed his belief that the methods adopted by the Company for the manufacture of gas are as good as those to be found in any part of the country. Mrs. G. F. Thompson, who was presented with a beautiful bouquet by Miss Joan Briggs (daughter of Mr. F. C. Briggs, the Engineer and Manager of the Company), said, in opening the exhibition, she felt that all her life she had been associated with the Dudley Gas Company, because her late father-in-law was a Director, and her late husband was a Director, and for some time Chairman. Mr. W. W. S. Westwood (Chairman of the Company) proposed a vote of thanks to Mrs. Thompson, Mr. Lloyd, and Mr. Briggs. In seconding, Mr. Theedam paid a tribute to the high capabilities of Mr. Briggs, and said that it was largely due to his scientific skill and knowledge that gas could be obtained at a low price in Dudley at the present time.

There is ample evidence in the accompanying photographs of first-rate design and display; both stands (among which were model rooms) and apparatus being arranged to the best advantage. The general lighting was by Messrs. W. Sugg & Co.'s superheater lamps, fitted in pairs, with distance control; and other exhibitors included Messrs. Falk, Stadelmann, & Co., Ltd., the Richmond Gas Stove and Meter Company, Ltd., Messrs. W. M. Still & Sons, Ltd., Messrs. Wilsons & Mathiesons, Ltd., and Messrs. J. Wright & Co.

"Electrician" Annual Tables.

This year the "Electrician" Annual Tables of Electricity Undertakings—which publication needs no introduction to our readers—contains particulars of many additional undertakings in Great Britain, Europe, the Colonies, and other countries; the total number of concerns dealt with being over 2000. Further information regarding the mains and distributors, converting plant, output for year, showrooms, &c., which has been inserted in the present edition, which is the thirty-ninth, increases the utility of the Tables to manufacturers, suppliers, and engineers generally, who in the past have found them invaluable. The publishers are Messrs. Benn Brothers, Ltd., and the price of the Tables is 10s. 9d. post free (inland), and 11s. abroad.

DETERMINING THE CHARACTERISTICS OF COKE.

[Abstracts from a Lecture by Prof. R. V. Wheeler, before the Sheffield Society of Engineers and Metallurgists, at Sheffield University on April 19.]

Remarking on the preference crucible steel melters show for beehive coke, Prof. Wheeler said they also differentiate between beehive cokes with respect to qualities which, though they seem difficult to define, are of undoubted importance to the melter. As part of the investigations on coke and its manufacture which are being carried out at Sheffield University, attempts are being made to express, in terms of their physical and chemical properties, those somewhat ill-defined qualities ascribed by the steel melter to the cokes he prefers. This is a necessary preliminary to attempts to produce, by means other than the beehive oven, cokes having such qualities.

The chief requirement as regards the manner of burning of the coke is that the rate should be an economical one. A dense coke is usually found to burn too slowly, and to give clinker trouble, while a very light coke will burn too quickly. The main difficulty ascribed to the use of bye-product coke lies in the troublesome clinker formed.

At present we cannot definitely relate the combustibility or "reactivity" of a coke with other measurable physical properties, and have to rely mainly upon comparative trials. For this purpose there has recently been installed in the metallurgical laboratories of the University of Sheffield an example of the apparatus devised by the United States Bureau of Mines, for obtaining a measure of the relative combustibilities of different fuels. In this furnace, which is of circular cross-section, water-cooled sampling tubes are disposed radially so that a sample of the gases, at every 1½ in. interval above the grate, may be collected. The combustibility of the coke may be measured by the distance from the firebars at which the oxygen of the air is used up, or by a term expressing the conversion of carbon dioxide into carbon monoxide as a percentage of the maximum conversion possible.

Regarding clinker formation, the suggestion is made that where there is lack of uniformity of structure, local high temperatures, causing fusion of the ash, may be produced during combustion. The fusibility of the ash is naturally an important factor in clinker formation, but it is difficult to explain why, as has been found to be the case, cokes containing the same amount and character of ash should behave so differently with respect to clinker formation when burning apparently under similar conditions. It may be that the extent of the oxidizing and reducing zones in the fuel bed is of importance in this connection, the melting-point of most coal ash being lower in a reducing than in an oxidizing atmosphere. The manner in which coke burns in a fuel bed is dependent in part upon the degree and uniformity of porosity of the individual pieces, in part on the character of the material forming the cell walls, and in part on the manner in which the pieces pack into the furnace.

Of the methods that have been suggested for modifying the structure of bye-product coke, generally with the intention of producing a more reactive material, that of blending the coals to be carbonized, coupled with rapid heating in narrow ovens, appears to be the most promising. In the course of a research on the desulphurization of coal during coking, carried out in the Fuel Department of Sheffield University by Mr. J. Jolly, a blend of coking slack and anthracite duff was coked in a bye-product oven. The coke produced differed considerably from normal bye-product coke in physical properties, more particularly as regards the amount of cross-fracturing of the pieces and the character of the pore structure. This coke was used, with beehive coke for comparison, for trial melts in the Metallurgical Department under the supervision of Mr. F. K. Knowles. The bye-product coke was satisfactory as regards its manner of burning, yielding the necessary high temperature in good time, and maintaining an intense heat after the fuel bed had been allowed to burn down, and the pot had been removed —a good test for crucible steel coke. It suffered by comparison with the beehive coke, however, in being difficult to break into suitable pieces, and in yielding rather a high proportion of breeze. In general, the results of the trial were most encouraging; and further experiments, designed to produce a more readily breakable coke, are now in progress.

SCHOOL LIGHTING.

MODERN REQUIREMENTS AND RECENT PROGRESS.

[Abstract of a Paper before the Illuminating Engineering Society.]

"We discuss school lighting once more," said Dr. James Kerr, M.A., M.D. (late School Medical Officer for London), in a paper he read at a meeting of the Illuminating Engineering Society on April 29, at the Royal Society of Arts, "because a fifth of the population spend many hours daily in school. The past dozen years, with all their record of high endeavour, have produced a change. Our standards are different. In social affairs of common interest our aims are no longer to find a minimum; we seek an optimum."

On the question of natural lighting, the author suggested that the daylight report in 1914 was a complete statement not now requiring amplification. It brought out the value of relative photometry and defined the minimum illumination of a school place as 1 p.ct. of the outside window-sill illumination. This report, he continued, first set out the enormous importance of the light adaptation of the eye as the underlying element in comfort—a fact which should be kept in mind when dealing with schemes of artificial illumination. In view of the post-war discoveries of the stimulating effect of the short wave-lengths lying in the ultra-violet—rays which are stopped by window glass—the upper parts of windows should be kept open as much as possible, and the provision of specially transparent glass for the upper parts of the windows should be considered as soon as it comes within the range of reasonable cost.

Coming on to artificial lighting, he put forward that the most important code is the American Standards for School Illumination, recognized by the Illuminating Engineering Society there, dated June, 1924. The reports of the American Society should be accepted as valuable suggestions for guidance, rather than standards for regulations; for light is like warmth, and within certain limits the more you get, the more you want. American ideals for warming have crept up to 60° or 80° Fahr., and one is apt to wonder if their illumination ideals are following a similar course. The minimum artificial illumination of any school place should be 2 foot-candles.

Well-illuminated detail is educationally needed, especially for the younger children. Ordinary testing of school children's vision shows that in the first half of school life about one-third fail to attain the normal standards. A considerable allowance for sub-normal vision has therefore to be made. It is useful to remember, said Dr. Kerr, that summer testing gives higher percentages normal than winter testing—presumably an indirect effect of illumination. Ten per cent. of the children leave the primary schools permanently short-sighted. Lighting tests by deciphering letters or numbers, or reading print, are likely to under-estimate the optimum illumination by gross amounts. If one doubles the minimum demand, one would hardly be wrong. The optimum to recommend is just as much as is necessary or desirable. Experience shows that a child will not suffer obvious visual harm, and ought to get proper educational advantage, with amounts of illumination about 5 to 7 foot-candles. Below this, while the child can do its work, it does it under an unfair load of effort.

Turning from the hygienic to the engineering aspect, the author said that the means of illumination are now greater and cheaper. The gasfilled lamp and the high-pressure and superheated low-pressure inverted gas burner have given light sources which present conditions completely different from those which existed in the days of the carbon filament lamp and the bare gas flame. The intense primary sources of to-day have to be diffused. Instead of filaments or mantles of high intrinsic brilliance, a large, evenly illuminated source of three or four hundred times less intensity is used to give a smooth, agreeable light. The inverted gas mantle or the gasfilled lamp, unshaded, are dangerous in school. [We would interpolate here that the unshaded gasfilled lamp is far more dangerous than the unshaded gas mantle.] All naked sources should be shaded or screened. The eye can endure the average brightness of the sky—about 3 candles per sq. in. The use of higher brightness, as, for instance, 5 candles, may be permissible when light sources are high up, out of the usual visual field, but the lower value must be insisted on for classroom purposes. The nature of the distribution of the light—direct, semi-indirect, or indirect —has been much discussed. For school lighting, the indirect system may be left out. Most school doctors would perhaps say semi-indirect; but with the coming of high-power sources, and the provision of large globes or shades reducing the intensity to about 3 candles per sq. in. of light source, there is no hygienic preference for direct or semi-indirect worth discussing.

The author remarked that if a large education authority is to get full value for its money, and maintain efficiency in lighting, it will have to appoint men for this special duty as illumination inspectors. [Here we will make a second interpolation—that this difficulty is eliminated if gas is used and the gas undertaking has a maintenance system in force.]

The paper concluded by the suggestion that optimum artificial lighting for school-rooms should be obtained by large light sources of an intrinsic brilliance up to 3 candles per sq. in., giving an evenly diffused lighting of about 5 foot-candles on each desk. Blackboards need accessory illumination of at least 60 p.ct. over the rest of the room.

KOPPERS VERTICAL CHAMBER OVEN.

At the Cracow Gas-Works there has been in operation for some time a plant consisting of four Koppers vertical continuous chamber ovens; and the following particulars of results obtained are extracted from the guarantee test published in issue No. 3 of the "Koppers Magazine" (the Journal of the Koppers Coke Oven Company, Ltd.).

The coal carbonized was from the upper Silesian coalfield, and as charged into the ovens had the composition stated below:

	P.Ct.
Water	5·30
Ash	8·16
Ash-free dry coal	86·54

The fuel gas for heating the retorts was obtained from a single outside producer of the Koppers type, working on coke breeze of the following analysis:

	P.Ct.
Water	18·54
Ash	12·98
Combustibles	68·48

In view of the difficulty experienced in most gas producers of burning coke breeze containing any considerable proportion of fines, it is interesting to record the screen analysis of the producer fuel:

	P.Ct.
0— 5 mm..	33·0
5—10 mm..	7·6
10—25 mm..	58·3
above 25 mm..	1·1

The guarantees were based on coal containing 8 p.ct. of ash and 3 p.ct. of water. The observed figures given in the second column have therefore been calculated to the basis of coal of the guaranteed composition; the calculated figures being given in the third column:

—	Actual Figures Obtained on Coal as Used.	Figures Based on Guaranteed Coal.	
		Obtained.	Guaranteed.
Gas made—c.ft. per ton	16,900	17,390	16,190
Calorific value—B.Th.U. per c.ft.	462·5	462·5	462—473
Gaseous therm yield per ton	78·2	80·3	74·7—76·5
Gas made per 24 hours—c.ft.	702,000	725,000	565,500
FUEL CONSUMPTION.			
B.Th.U. per lb. of coal carbonized	1,510	1,510	2,143
Therms per ton of coal carbonized	33·8	33·8	48·00
Lbs. of carbon supplied to gas producers per 100 lbs. of coal carbonized	10·45	10·45	14·84

Thus the gas production was 25 p.ct. higher, and the fuel consumption 33⅓ p.ct. lower, than the guaranteed figures.

LAUNDRY AND ALLIED TRADES EXHIBITION.

This year more space than ever has been required to accommodate the displays at the Royal Agricultural Hall, Islington, in connection with the International Laundry and Allied Trades Exhibition held under the auspices of bodies representative of the industry, and organized by Messrs. F. W. Bridges & Sons, Ltd. In no sense does the exhibition appear to have suffered by reason of its forced postponement, owing to the strike, from the time originally fixed, until May 21 to May 28 inclusive. Anyone who regards "doing the washing" as being still the simple occupation it once was, will receive something of a shock on seeing the huge, and complicated, machines that have been set up in the Agricultural Hall for the brief space of one week; while others who may regard laundry work as being of the nature of a mystery, can lessen their wonder, while increasing their admiration, by examining what there is on view at Islington, where a number of the most imposing exhibits are in actual operation.

With the washing, mangling, ironing, and dressing machines themselves, there is no need to concern ourselves here, beyond remarking upon the extraordinary amount of skill that has evidently been expended upon their design and manufacture.

STEAM RAISING.

Among the most important of laundry operations is steam raising. Steam engines and boilers suitable for the industry are shown by Messrs. Davey, Paxman, & Co., Ltd., of the Standard Iron-Works, Colchester; Messrs. E. S. Hindley & Sons, of Bourton, Dorset; and Messrs. Robey & Co., Ltd., of Globe Works, Lincoln. There is an arresting display of Cochran boilers, by Messrs. Cochran & Co., Annan, Ltd., of Annan. Engine and motor driven centrifugal pumps are exhibited by Messrs. W. H. Allen, Sons, & Co., Ltd., of Queen's Engineering Works, Bedford; and pumps of various kinds, by Messrs. Frank Pearn & Co., Ltd., of Thomas Street, West Gorton, Manchester. Another firm showing pumps and feedwater regulators are Messrs. A. G. Mumford, Ltd., of Culver Street Engineering Works, Colchester. One can inspect the various specialities of Messrs. Hobdell, Way, & Co., Ltd., of 45, Church Street, Minories, London, E., one of whose branches is the conservation of heat in all classes of boiler and steam pipe work.

Also in the steam raising division may be mentioned the Turbine Furnace Company, Ltd., of 238B, Gray's Inn Road, London, W.C., whose patent furnace is designed for the utilization of any class and grade of fuel. On the same stand is the "Vulcan" patent boiler tube and flue cleaner. The Crosthwaite patent mechanical stoker and self-cleaning furnace, and the fixed forced draught furnace of the same name, are shown by the Crosthwaite Engineering and Furnace Company, Ltd., of York Street Iron-Works, Leeds.

WATER SOFTENING.

Water softening is another process which, of course, makes special appeal to laundry proprietors. As agents for United Water Softeners, Ltd., a "Permutit" plant is shown in operation by Messrs. Baker, Perkins, Ltd., of Westwood Works, Peterborough. United Water Softeners, Ltd., of Aldwych House, London, W.C., have several "Permutit" plants of the latest type in operation; and the water supply to the Agricultural Hall is being continuously softened in these plants to "zero hardness." There is, too, the system of the Kennicott Water Softener Company, of Wolverhampton, in which the zeolite employed is a natural mineral known as "Kenzelite."

Still another plant is the patent "XL" water softening apparatus upon the lime-soda system, and also the "Zepho" zeolite pressure plant, of the Becco Engineering and Chemical Company, of 158-160, City Road, London, E.C. Messrs. William Boby & Co., Ltd., of 62, Brook Street, Hanover Square, London, W., show three designs of water softeners—the "Azed," which is on the base-exchange system, and the "Simplex" and "K" lime-soda softeners. There is a scale model of an up-to-date water softening plant on the stand of Messrs. Wilson & Perrett, Ltd., of Ferrier Works, Fairfield Street, Wandsworth.

GAS APPLIANCES.

The High-Pressure Gas Lighting and Heating Company, Ltd., of Newton Works, Macklin Street, Holborn, W.C., draw attention to their high-pressure gas plant, including the improved Cook double-action automatic compressor, in two capacities—250 c.ft. and 500 c.ft. an hour. The special feature of this compressor is that it is perfectly automatic in its action, and adjusts itself to give the correct supply, from full load to one light or iron. This is obtained by a specially designed regulating valve in conjunction with the friction drive. At the same time, if it is desired to have different pressures at different parts of the system, this is easily obtained by fixing an extra regulating valve at small cost. The Cook high-pressure gas iron is made in various weights; while where only normal pressure is available, the "A. G." iron may be used.

A large range of rotary gas compressors, with hand irons and accessories for general ironing equipment, is to be seen on the stand of Messrs. Lister Bros., of Nightingale Vale, Woolwich, S.E.

The British Dyestuffs Corporation, Ltd., are exhibiting dyeing on cotton, wool, silk, and artificial silk.

Leather belting is displayed by Messrs. Graton & Knight, Ltd., of 2, Pembroke Street, King's Cross, London, N.; the Spartan Manufacturing Company, Ltd., of 319-329, Weston Street, London, S.E.; and Mr. Henry Beakbane, of the Tannery, Stourport, whose "Fortox" leathers are well known in the gas industry. "Flexo" leather and textile belting, together with their well-known "Permac" jointing material, oil-reclaiming plant, and refractory cements, are exhibited by Messrs. Thomas & Bishop, Ltd., of 37, Tabernacle Street, London, E.C.

An International Conference on Coal.—According to plans now being drawn up by Dr. Thomas S. Baker (the President), there is to be, at the end of next November, an international conference on coal, at the Carnegie Institute of Technology, Pittsburgh. The fundamental idea of the meeting is the discussion by prominent scientists of new uses for bituminous coal. Among topics now under consideration for discussion are low-temperature carbonization, generation of power at the mines, and domestic use of coke. Dr. Baker plans to visit Europe this summer in connection with the conference; and while doing so, he may be reached through the Guaranty Trust Company, London.

RESTRICTION OF GAS CONSUMPTION AT THE SOURCE OF SUPPLY.

By Norton H. Humphrys.

The directions to gas undertakings for restriction of gas consumption, a term that implies substantial reduction without important inconvenience or drastic action such as total cessation of supply, as set forth in Part VII. of form E.4. issued under the provisions of the Emergency Powers Act, 1920, are open to many objections. In some respects they are antiquated and fully applicable only to the period when the open flat-flame burner was the leading source of consumption. A 6 c.ft. per hour batswing or union can be turned down to 5 c.ft. or 4 c.ft. with partial, though not entire, loss of efficiency; but modern substitutes, which take the bulk of the present-day consumption, are different in character. Reductions in quality or supply are not evenly or fairly distributed; one consumer experiences the full force, while another is not even aware of them. The whole subject is of sufficient importance, to both suppliers and users, to warrant full and complete examination from all points of view. Some items which might with advantage receive further investigation are indicated in the course of the following remarks.

Gas undertakings have accumulated experience respecting their capabilities in the direction of reducing consumption of gas when called upon to adopt such an undesirable course of action. The output during war years was subject to so many variations, some telling one way, some the other, that the results cannot be closely defined; and this applies in a lesser degree to the four months' coal stoppage in 1921. Given three years of even work unbroken by no cause other than a four months' stoppage of coal in the course of the middle year, the consumption during the affected period can be compared with that during corresponding periods of the previous and of the succeeding year. In few cases has this been practicable.

A student tracing the annual consumption of gas throughout the United Kingdom would not be impressed by any special difference in 1921. Starting from 1916, the production was remarkably level. Passing 233, 232, 235, 250, and 242, we arrive at 260 thousand million c.ft. during the strike year; then follow three years, limited between 265 and 270; 282 for 1924; and 295 for 1925. Few other industries can show such even tenor; and the record constitutes evidence of the extent to which the supply of gas is established as a necessity of modern existence.

The monthly outputs of half-a-dozen gas undertakings during the years 1920-22 show that under average conditions the reduction of consumption during the strike was less than 10 p.ct. The causes may be shortage of coal or action of labour unions. Previous to the existing disturbance they were confined to one direction. But now we are having a taste of what can be done in the way of united lightning and combined resistance. Ample stocks of coal, and the assistance afforded by a substantial C.W.G. plant, enabled many gas undertakings successfully to tide the crisis in 1921. At present there is fair prospect of difficulty being limited to supplies of coal, and therefore to those who on May 1 could only estimate available stocks in terms of days or weeks, rather than months, or have no alternative resources.

The introduction of stoking and conveying machinery, of vertical retorts, and of cupola processes, has to a large extent counteracted the pernicious effects due to forced stoppage of either coal or labour. For obvious reasons, some are not able to avail themselves of the assistance thus afforded. Against this may be set the fact that 100 tons of coal are more readily obtained than 10,000, and the place of a dozen malcontents more easily filled than a vacancy due to the secession of some hundreds. At a time when all sorts and sizes were entirely dependent on manual labour, the larger the scale of operation, the more acute was the trouble. Now the contrary condition obtains. Even a large output can be maintained at a pinch by the foremen and clerical staff, with some help from the distribution department.

The methods at the command of gas undertakings as set forth in Part VII. may be summarized as (1) processes for manufacture of gas from materials other than coal; (2) getting the best possible value out of the coal used—*i.e.*, improving the present methods of working; (3) reduction of quality; (4) reduction of supply pressure. The first can be passed without further notice, and the second is somewhat superfluous. The regular working of a gas undertaking includes getting the best possible value out of the coal consumed; and any defects are more easily dealt with at quiet times than in presence of the excitement attendant upon special public disturbances. The third is a relic of times when the value of gas was assessed by the cubic foot, and previous to the acceptance of the maxim that "one therm is as good as another." In a modern retort house the objective is the maximum number not of cubic feet, but of therms, per ton of coal carbonized. That the two agree is by no means established. In fact, the contrary seems to obtain.

The quality of the product may be reduced by degradation or by dilution. Under conditions of higher temperature, smaller charges, and longer working periods, secondary reactions are increased, and the heavier hydrocarbons are reduced to a larger bulk of weaker constituents. But this process is invariably attended with loss of carbon by deposition in a solid form. The production of therms is diminished, and cannot by any possibility be increased. Air or furnace gases may be drawn into the retort by increasing the pull of the exhauster, but will not add to the production of therms; and there is risk of loss by combustion in the retort, indicated by the presence of an abnormal proportion of water and carbon dioxide. There is good reason for belief that such action obtains, especially under favourable conditions such as a forced temperature, excessive vacuum, or a large space or void above the charge. The only convenient diluent at any subsequent stage is air; and of this, only the nitrogen can be claimed as an "inert" in the fullest sense of the word. Oxygen, and carbon dioxide or water vapour, are shown by the Institution of Gas Engineers' Research Reports, to be active corrosive agents, likely to accelerate deterioration of all wrought-iron or steel surfaces that may be exposed to their action, also to injure and interfere with correct registration of meters. The extended use of wrought iron or steel as a material for distributing mains increases the importance of attention to this point.

Serious objections can be urged against reductions of supply pressure, particularly if these reductions are attended with poorer quality. They can only be fairly and evenly divided between one consumer and another in a district practically level, and by distributing plant of a capacity equal to the reduction to a negligible quantity of the loss of pressure between the source of supply and each consumer's meter. Those situated in high-level parts, or next door to the gas distributing station, under ordinary conditions receive a substantial excess, because the supply must be so adjusted as to ensure sufficiency at low levels and distant points. In practice a reduction may be effected on the consumer's premises by the use of a pressure regulator in the meter inlet, or more commonly by turning back the main tap. The user situated at the top of the hill may not be aware of any reduction, at a time when his less fortunate fellow townsman at the foot is experiencing serious inconvenience.

Much depends on the conditions obtaining on the consumer's side of the meter. To take one extreme, there are service supplies consisting of 50 ft. or more run of ¾-in. pipe, further weakened by several bends or elbows; an equally inefficient arrangement of inside distributing pipes, handicapped by accumulations of rust, external denting or flattening, and other defects that are built up in the course of years; and a No. 2 standard meter. The whole is expected to furnish ample supply for an average-size family cooker, a gas fire or two, and perhaps a geyser, in addition to the usual complement of lights. If coupled with the disadvantages due to distance or unfavourable level, there is keen sensitivity to every trifling fluctuation in supply pressure, such as may be caused by variations in neighbours' requirements from hour to hour.

The distributing mains are not without their share, which varies according to the ratio between their capacity and the maximum demand, as controlling the loss of pressure caused by conveyance to the several services.

Given a reduction of 10 tenths pressure at the outlet of the governor—say, from 60 to 50 tenths, or 16 p.ct.—there will be a similar reduction in all parts of the district. We have seen that the meter inlet pressure may range from something considerably above the initial, to a bare sufficiency; and therefore the effect as expressed in percentages of the normal may be anything below 16, or may approach 40 or even 50. A fortunately situated customer provided with a pressure regulator will not know of supply pressure reduction until it approaches the limit at which his regulator is set. Or, if he follows the usual method of pressure adjustment by tap, he can maintain a good supply, perhaps unwittingly, by more liberality in that direction.

In other ways a reduced supply pressure or lower quality may not only fail to diminish consumption, but tend to increase it. The majority of the numerous purposes, both domestic and industrial, for which gas is required are fixed in character. An oven must be raised to, and maintained at, a certain temperature, a known weight of metal must be melted, or a definite quantity of water must be raised to boiling-point. Under reduced supply conditions, gas must be consumed over a longer period; and probably more will be used, rather than less. As applied to the incandescent type of lighting burner, now in practically universal use, there is only an indecisive half-way house between efficiency and shutting-off. The appliance can be displaced in favour of another means of lighting, but the consumer probably prefers to increase the supply, to the extent of setting the gas valve fully open if necessary. Many other similar examples might be mentioned.

Especially does this line of argument apply to cooking (probably in many respects the most profitable to the supplier), in connection with which a deficient supply of gas creates more immediate personal inconvenience and annoyance than with any other. In laying out a reduction scheme, the cookers should have the first consideration, as drastic reductions at the local

meal preparation hours are sure to be attended not only with some temporary, but with permanent, loss of business. The extent to which any dispute affecting efficiency of supply clears the way and opens up a harvest time for competitors should be more widely appreciated than appears to be the case with the coal industry.

The conclusion is that the capabilities of gas undertakings for reduction of consumption are limited, uncertain, and, being unevenly distributed, are sure to be attended with more than a fair amount of inconvenience to the users unfortunately situated. A more promising direction in which to look for assistance is the wide margin for exercise of common sense and ingenuity open to all the users in view of the gravity of the situation. In an average dwelling house, there are lights in the hall, passages, bed rooms, and other places, habitually in full operation from an early hour in the evening, until closing time, which can be dispensed with, except during the short intervals when they are really in service, without anyone being a penny the worse. Matters are facilitated where by-passes are in use, and in the event of prolonged stress, small appliances of the midget type can be substituted. In connection with the household requirements of hot water, and with cooking, there is also a wide field for exercise of economy. Many frugal housekeepers take care to see that the oven is well filled, when required for use, or conduct three or more distinct operations over a single burner, with the aid of a suitable type of steamer. At the time when culinary demonstrations were popular, the connection of a test meter fitted with a large dial to the gas supply for the platform was a common practice; and the small quantity of gas consumed during an hour's lecture not only attracted attention, but occasionally led to trouble at the complaint office counter.

Announcements of reduced pressures, emanating from the gas office, should not fail to give prominence to the fact that the consumers can do more than the supplier in the way of restricting consumption.

GAS INSTITUTE OF NEW ZEALAND.

SECOND ANNUAL MEETING.

The Second Annual Meeting of the Institute was held at Timaru and Dunedin, on Feb. 10 to 13, under the Presidency of Mr. W. A. COURTIS, the Engineer and Manager of the Timaru Gas Company, Ltd. Copies of the address and papers read have been forwarded to us by Mr. H. Rands, the Hon. Secretary.

The annual report stated that the membership of the Institute now totals 63. Several deaths had to be recorded—those of Mr. G. D. Stone, Manager of the Wanganui Corporation Gas-Works (who was President of the Institute); Mr. G. Davis, Manager of the Daunevirke Gas-Works; and Mr. R. C. Bishop, General Manager of the Christchurch Gas, Coal, and Coke Company, Ltd.

PRESIDENTIAL ADDRESS.

Mr. COURTIS, in the course of his Presidential Address, dealt briefly with the Board of Trade regulations, taxation, the use of gas engines on gas-works, and technical training within the gas industry. He then made the following remarks on the progress of the Timaru Gas Company.

As this is the jubilee year of our undertaking in Timaru, I feel it will not be out of place for me to give you a short résumé of its operations from its inception to the present day. The Company was started with a capital of £10,000—2000 shares of £5 each. The works, when completed, consisted of retort house, containing two settings of three retorts each; vertical pipe condensers; coke-filled scrubber; four cast-iron purifier boxes with centre valve (these boxes were 4 ft. square and 3 ft. deep); station meter, with a capacity of 1200 c.ft. per hour; gasholder of 15,000 c.ft. capacity; and town governor. The reticulation of the town was provided for with 3 miles of cast-iron mains, varying in size from 2½ in. to 6 in. The works were designed and erected for the Company by my father, the whole of the plant coming from Melbourne; and notwithstanding the then difficulty in procuring plant and shipping facilities, the work was completed in six months after a start was made, gas being first turned into the town in March, 1876.

The output for the first twelve months was 2¼ million c.ft.; there being 150 meters in use by the end of the year. However, the business prospered as the town grew, and the Directors were soon able to declare a 15 p.ct. dividend on the paid-up capital. They continued this rate for some years. As the output increased, it was found necessary to instal larger plant. An exhauster was added, a larger condenser, and a gasholder of 20,000 c.ft. capacity was imported from Glasgow.

By 1892 the output of gas had risen to 8¾ million c.ft. per annum; and then it was found necessary to enlarge the purifying plant (and a change-over from lime to oxide was made). With this in view, a set of four boxes, 8 ft. square and 5 ft. deep, in ferro-concrete, was installed; and these are still in evidence, though not in use. I think these reinforced concrete purifiers were probably the first experimented with; they were certainly the first put into use in New Zealand. Further, a 6000 c.ft. per hour station meter replaced the smaller one.

At this date (1893) I was appointed Engineer and Manager, in succession to my brother, who had been in charge since the works started operations; he having accepted the appointment of Engineer to the Dunedin Works. When I took charge, the output of gas had risen to 9½ million c.ft. per annum. New Zealand at this time was experiencing a heavy slump after the boom, and gas suppliers felt its effect very seriously. However, a town like Timaru, with its wonderful back-country, could not be expected to continue long dormant. The demand for gas became more general. I may mention that at this date our selling price for gas was 5s. 10d. per 1000 c.ft. for large consumers for both lighting and heating purposes, and 9s. for smaller consumers. These prices at that time compared favourably with those charged in larger centres.

As the demand for gas increased steadily from now on, it became necessary further to enlarge our plant. A gasholder of 60,000 c.ft. capacity was secured from the Barrowfield Iron-Works, at a cost of £4500. A larger exhauster had to be procured, also a Livesey washer of a capacity of 250,000 c.ft. per 24 hours. With these additions, we were fairly able to cope with the increasing demand for gas. By 1910, however, our output had so increased that I had to take a general review of what was to be done to meet the demand. I may say that up to this time our carbonizing plant consisted of four settings of five retorts each, all direct fired.

My recommendations to my Directors were for a new retort house, eight settings of six retorts each, Ω shaped, 24 in. by 15 in. by 9 ft., heated by generator furnaces. The whole of the settings were not at first built-in. Included in my recommendation was another gasholder, with an effective capacity of 120,000 c.ft., also four cast-iron purifier boxes 16 ft. by 16 ft. by 5 ft., with 12-in. connections. The cost of this work was in the vicinity of £10,000—a fairly large request. However, it was agreed to by the Directors, and the whole of the work put in hand and completed in eighteen months. These settings of Messrs. Gibbons Bros. gave every satisfaction, and have continued to do so up to the present.

From 1914 for the duration of the war, our output, 41 millions, remained practically stationary. After the armistice, the demand for gas jumped-up by leaps and bounds, the first year by 6½ millions, the following year by 5 millions, or 11½ millions increase in two years. This increase, though very gratifying, also gave me cause for consideration. If this increase continued for the next two years, we should have been perilously near our limit of production. It was therefore necessary for me to consider ways and means.

In our cramped position, I could see only a few years ahead by increasing our present horizontal settings, and that at a very considerable cost, which I did not consider I should be justified in recommending to my Directors. Of course, the horizontals could have been supplemented by a water gas plant; but this would have given little relief from the worries of retort house attendants. In the last two years of the war our stokers' wages rose from 14s. to 18s. per shift. The last demand was for 20s., with a threatened strike if not agreed to on the following day. However, this was got over without conceding their demand. It, however, confirmed my opinion that some method of carbonizing should be adopted that would do away with some of the unreliable retort house manual labour, and replace it by mechanical apparatus.

With this in view, I seriously considered the advisability of adopting a continuous vertical installation. At the same time I had to consider procuring a centrifugal washer and larger station meter. These latter were at once ordered from England, erected, and put into action. The carbonizing plant required further deliberation, as it meant a large expenditure—one might say an alarming expenditure, when I state that at this time our paid-up capital was only £25,000, and the estimated cost of installation, in conjunction with other expenditure, would necessitate the outlay of a sum in excess of that amount. However, my Directors, after consideration, decided to carry out my recommendation to instal vertical settings, and accepted the tender of West's Gas Improvement Company to erect a setting of six retorts, with elevator and breaker plant, waste-heat boiler and lift. At this date, I may say, our make of gas had reached 54 million c.ft. per annum.

As I have before mentioned, our subscribed capital was £25,000, which works out at approximately £463 capital invested per million c.ft. of gas produced. To arrive at so small a capital cost per million c.ft. of gas produced, replacements and additions to plant have been met out of profits. Of course, as we all know, there are two opinions on this subject. In our

case, I think my Directors were justified in the course they adopted, as the selling price of our gas in 1914, when business was normal, was 5s. and 6s. 3d. per 1000 c.ft.; the latter for small lighting consumers. These prices must be deemed most reasonable, considering the output of our works at that time.

The vertical installation has only just been completed. I am therefore unable to give, as I had hoped, the results obtainable from such settings when adopted by works of our size, which would no doubt have been of interest to many of our members. My object in writing this part of my address was to show what can be done in the way of supplying gas at a reasonable price and still keeping down the subscribed capital. If I have succeeded in this, I am satisfied.

GAS SUPPLY TO A NEW DISTRICT.

(By A. Morrie Taylor, Chief Inspector, Wellington Gas Company, Ltd.)

[Extracted.]

In 1924 the Wellington Gas Company manufactured 560 million c.ft. of gas. They have nearly 20,000 consumers, 18,576 master meters and 1019 check meters, and 165 miles of mains. The Company are liberal in regard to the laying of mains, and also in connection with the length of service piping laid without charge. For example, piping is allowed free of charge, from the fence-line of street, as follows:

Lighting Points.

If 10 lighting points are installed	50 ft.
If 15 " " " "	75 ft.
If 20 " " " "	100 ft.
Maximum allowance	100 ft.

Where no lighting points are installed, the total piping allowed is:

For a gas cooker only	50 ft.
For a bath heater	25 ft.
For a gas copper or fire	25 ft.

All extra service piping is charged for as under:

	s.	d.
1 in. per ft.	1	6
1¼ in. per ft.	2	0
1½ in. per ft.	2	6
2 in. per ft.	3	0

Includes labour, materials, and reinstating.

Popularity of Gas.

As an indication of the popularity of gas in Wellington, against the keenest electrical competition, the following will be of interest. During 1924 the highest results in connection with distribution in the history of the Company were obtained, and are as follows:

New services installed	950
Cookers installed	1169
Bath heaters or geysers	269
Washing coppers	74
Fires and radiators	300
Mains laid (miles)	12
Fitting jobs, additional to above	4570

High-Pressure Gas Supply.

One of the suburbs, Seatoun, in the eastern district, is supplied by gas under a pressure of 3 to 4 lbs. per sq. in., to the inlet of a service governor, which is installed on each consumer's premises—the governor being adjusted for a constant outlet of 4 in. of water. The Company also employ boosting plant.

Supply to New District of Karori.

Some years back (about 1913) the then Borough Council of Karori (which suburb is approximately six miles from the Company's city gasholder) approached the Company with a view to obtaining a supply of gas from Wellington. A district representative was sent out to interview prospective consumers, and get the preliminary gas service application forms signed; but the inducement offered at that time was so poor and the conditions laid down by the Karori Borough Council so unfavourable to the Company, that negotiations were dropped, and nothing definite was done until 1923, when the Karori Borough was merged into Greater Wellington.

The people of Karori, having a very keen Progressive Association, comprised of ratepayers of the district, commenced negotiations with the Company for a gas supply early in 1923; and finally, at a meeting of the Association, it was promised on behalf of the Company that, after making a thorough canvass of the district, helped by all the members of the Association, if reasonable inducement was forthcoming from residents, the district would be reticulated with gas mains.

The Karori residential district is at its highest point approximately 780 ft. above sea level and gas-works level, and at the lowest point, about 440 ft. The residential buildings number 500. As a result of canvassing the whole district, about 200 householders were induced to sign (and practically all householders are house owners) the Company's gas service application form. Many others pointed out that they would not sign anything until they actually saw the Company laying the gas main down their particular street.

It was decided that a gas supply by means of low pressure should be laid on to Karori, and that only cast-iron pipes should be used. The next consideration was the class of cast-iron pipes to be employed. The pipe decided upon was Stanton De Lavaud cast-iron spun, including sizes 12 in., 8 in., 5 in., and 4 in. The spun pipe has been found to socket up with sand-cast pipes and specials perfectly.

Main laying was commenced on March 4, 1924. After a break from Dec. 2, 1924, till May 4, 1925, laying was recommenced. Owing to delay in pipe deliveries from England, it terminated on July 3, 1925. The total mileage of mains laid to June, 1925, was equal to 8 miles, 1522 yards, 1 ft.

The average costs per yard for the two important sizes of gas mains—*i.e.*, 12 in. and 4 in.—were as follows: Labour, 2s. 9·2d. (4 in.); 8s. 2·6d. (12 in.). Materials (includes mains, lead, yarn, specials, cartage), 7s. 9·6d. (4 in.); £1 14s. 6·3d. (12 in.). Total cost per yard—Labour and materials, 10s. 6·8d. (4 in.); £2 2s. 8·9d. (12 in.). The total cost to June, 1925, for mains, materials, labour, cartage, and hire of excavating machine was £13,028 1s. 4d. These costs do not include the Council charges for reinstating road metal.

Various lengths of mains were checked up and costed where the machine digger was used, and also lengths where all hand-digging was employed; and the saving in cost shown by machine excavating averages 25 p.ct.

As for the average cost of 200 services completed, labour accounted for £2 2s. 8·9d. per service, and material for £3 6s. 6·4d. per service. The total cost, including meters, was £1752 8s. 3d. for 16,603 ft. (average per service, £8 15s. 2·8d).

The accompanying table shows the costs in detail.

It is anticipated that every house in Karori will soon be connected to the Company's mains.

CHOICE OF A CALORIFIC VALUE.

(By F. W. J. Belton, Engineer, Christchurch Gas, Coal, and Coke Company, Ltd.)

What is the prime consideration? In my opinion it is this, that the gas supplied should contain the highest possible percentage of combustible constituents. The second, and equally important consideration, is that the gas should be of constant quality, and not subject to violent fluctuation in either composition or calorific value. Provided these two main points are carefully observed, and the consumers' appliances are properly adjusted, it matters little what calorific value of gas is supplied. The above dictum is subject to one reservation, the gas must not be of such high calorific value that it becomes difficult with ordinary working pressure to obtain proper aeration of the flame in the ordinary gas appliances in every-day use.

Karori. Gas Services.—*Details of Costs.*

Docket Number.	Size Service in Inches.	Length Service in Feet.	Hours Service Layer.	Hours Labourers.	Cost Gas Meter.	Size of Meter.	Wet or Dry Meter.	Cost of Labour.	Cost of Material.	Amount Charged to Consumer for Service over Length Allowed.	Amount Charged to Capital.	Total Cost of Job Completed.	Name and Address where Fixed.	Remarks.
					£ s. d.			£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.		
1908	1	119	5	11	3 2 0	10-lt.	Dry	2 3 2	4 2 6	1 2 6	8 5 2	9 7 8	T. Jones, 5, Burn St., Karori	

Karori. Gas Mains.—*Details of Costs.*

Size of Gas Main in Inches.	Cost Cast-Iron Pipes, Cartage, Lead, Yarn, Specials.	Total Cost of Labour Only.	Total Cost of Job Complete.	Cost per Yard, including Labour and Material.	Cost per Yard, Labour Only.	Length in Yards.	Street or Road.	Nature of Ground.	Labourers' Wages per Hour.	Remarks.
	£ s. d.	£ s. d.	£ s. d.	£ s. d.	s. d.				s. d.	
12	425 3 2	95 6 4	520 9 6	2 1 9·66	7 7·87	249	Wallace Street	Rotten rock and clay	2 0	Used explosives for blasting out rotten rock

N.B.—Gas mains and gas services costs were kept in the above detailed form right through the work of reticulation.

An objection may be raised that the calorific value may be brought so low that the distribution system will be inadequate to deal satisfactorily with the volume of gas required. The answer to that objection is in the first consideration laid down—namely, that the gas must contain the highest possible percentage of combustibles. If that proviso is adhered to, it is not possible to supply gas, except straight blue water gas, with a calorific value much below 400 B.Th.U. gross per c.ft.; and experience in supplying gas, in the same district, which was reduced over a period of three years from 530 B.Th.U. gross to (in emergency) 400 B.Th.U. gross shows that an average distribution system is easily capable of dealing with a gas quality alteration within these limits.

Now what other points must be considered in making a choice? They are:

(1) The type of gas making plant installed.
(2) The qualities of coal available.
(3) The residuals markets.
(4) The relation of residuals revenue to cost of coal.
(5) New plant in contemplation.
(6) The possibility of fluctuations in the residuals markets.

Let us endeavour as far as possible to review each of the above points in turn, though this will lead to some overlapping, as they are to a great extent inter-independent upon each other and the primary considerations.

Type of Gas Making Plant Installed.

An engineer is limited to some extent by the plant installed, and in some cases limited absolutely, if the primary considerations are to be observed. In the case of a works having only horizontal retorts, whether hand or machine stoked, with ordinarily good qualities of coal, the calorific value will not average less than 530 to 560 B.Th.U. gross per c.ft., unless inerts are pulled in from the furnaces, or an excessive amount of air is admitted for purification.

If, in such a works, either of these methods is adopted for reducing the calorific value, each brings its own penalty. In the first case naphthalene troubles come, and in the second instance purifier oxide goes "sour," and difficulties will be experienced in the extraction of sulphuretted hydrogen.

If a blue or carburetted water gas plant is available as well as the horizontal retorts, almost any calorific value of gas desired can be supplied, which will, with proper operation of the plants, comply with the two primary considerations. The deciding factors in this case will be commercial ones coming under the headings 2, 4, and 6. In the case of a works equipped with modern continuous vertical retorts, a wider range of calorific values can be supplied with absolute uniformity, and the question becomes one of residuals market relative to cost of coal, and also a question as to the capacity of the plant compared to the present output, and the rate of growth. It is possible with modern vertical retorts, and a coal which does not swell or make too dense a coke, to supply a gas of 400 B.Th.U. gross with only 12 p.ct. of inerts.

Qualities of Coal Available.

This consideration affects all works however equipped, and more especially those having vertical retorts. Horizontals can deal with any type of coal which makes a firm coke, and it then becomes a matter of what is the cheapest coal which, making a good coke without too much ash, will give the greatest yield of gaseous therms per ton with low inerts. With vertical retorts the question is more complicated, as some coals, owing to the physical characteristics of the coke, lend themselves more readily to steaming.

If the coals available swell and make a very dense hard coke, steaming cannot be practised to any extent without increasing the content of CO_2 in the finished gas to too high a figure; and the choice is therefore limited to this extent, independently of any commercial considerations. With a coal of this type, and continuous vertical retorts, probably 480 to 525 B.Th.U. will be the limits of gas quality available.

Residuals Market.

In a works making only straight horizontal retort gas, the markets have to be taken as they come, as it is not possible to exercise any control on them by limiting the consumption of coal for a given make of gas if our primary considerations are to be observed. If, however, water gas plant is available, or modern vertical retorts, a fair amount of control can be exercised. With a carburetted water gas plant and either vertical or horizontal retorts, a bad slump in coke can always be relieved without making any alterations to the declared calorific value. If a good market is available for residuals, then the calorific value should be left high, so as to carbonize as much coal as possible. This statement may be open to challenge on the ground that one B.Th.U. is as good as another, but experience shows that the consumer in use (as distinct from scientific testing) obtains a higher efficiency from a low calorific value than from a high calorific value gas.

Relation of Residuals Revenue to Cost of Coal.

This is a question which affects the use of every type of gas plant when calorific values are being considered. With horizontal retorts, cheap slacks may be used which, while giving a slightly lower calorific value of gas, and a smaller therm yield of gas per ton, than more expensive coals, will, owing to the return from residuals, give gas at a less cost per therm than a coal giving a higher therm yield.

This is especially the case with industrial areas having a coalfield adjacent and where there is a strong demand for coke all the year round. In New Zealand, however, there is such a small difference between the pit prices of slack and face coal, and the cost of carriage is so high, in most cases, in proportion to the total cost of the coal delivered into the works, that it pays to buy the better class of coal, owing to its lower ash content. As it is possible to recover a large proportion of the cost of coal from the sale of residuals, it is very important here to see that everything is done to increase their value.

In all cases where it is possible, in a separate water gas plant or by steaming in vertical retorts, to dilute the straight coal gas with blue or carburetted water gas, a balance-sheet must be carefully worked out, based on accurate working results obtained from the plant; account being taken not only of fuel used directly for making the water gas, but also of the boiler fuel and any extra labour required. In the case of vertical retorts one must also check carefully any extra fuel required in the producers to maintain the heats at the degree necessary for efficient water gas production. There is another factor which will enter into the calculation in this instance, and this is that in a vertical retort setting suitably designed for the steaming process the output of gaseous therms per unit of plant, and therefore per man per day, will be increased, so that labour costs will be less per therm. It is particularly important that all calculations should be equated on the therm basis, and not per 1000 c.ft. or per ton of coal.

New Plant in Contemplation.

If the installation of new plant is contemplated in the near future, the economic possibilities of this plant in regard to the production of various calorific values of gas should be very carefully examined and considered in regard to all local circumstances; because it is better, if the new plant can more economically supply a lower calorific value of gas than the present plant is supplying, to declare a value straight away which will not need alteration when the new unit comes into operation. Alterations of declared calorific values should be as infrequent as possible, as the public always get an impression that alterations of that mysterious thing "calorific value" mean that the gas company is trying another dodge to squeeze more out of them. There is also the point that the lower declaration provides an opportunity *gradually* to reduce the calorific value to the new standard; and during this period the consumers' appliances can be adjusted. This procedure might mean the temporary violation of the principle first laid down, but as it would be only a temporary infringement, the gain in not having all the consumers' appliances requiring adjustment at the same time would justify doing so.

Possibility of Fluctuations in the Residuals Markets.

It is not sufficient or wise, in working out estimates of the relative economy of manufacture as between different calorific values, merely to take into account the current market values of the various residuals. One may find oneself at the moment having a boom in residuals, or prices may be low. A careful review is necessary of the possibilities of fluctuation in the market either above or below the then ruling values, because satisfaction of the consumer and stability of calorific value are in the long run of more worth to a gas undertaking's business than a slight temporary gain due to a momentary opportunity given by the residuals market. In fact, the gain in revenue from the residuals may be more than counter-balanced by the expense of having, in a short time, to re-adjust the consumers' appliances to suit the altered calorific value. Again the position may arise that renewals or modernisation of plant is under way, or will shortly be carried out, which may mean a considerable increase in the coke available for sale. Under present conditions there may be a local shortage of coke, and an apparently acute shortage may be only due actually to a deficiency in supply of two or three hundred tons, and a high price may be obtainable, while the effect of the renewal or modernization may be to put several times that amount of extra coke in the yard. Then, the urgent demand satisfied, the price has to be dropped to sell the remainder. In these circumstances it is better to declare such a calorific value that the consumption of coke for water gas is such that when the extra coke is available it will not be largely in excess of the demand. By adopting a policy of this kind, not only is the calorific value stabilized, but the value of the coke is saved from such violent fluctuations.

Perhaps it may be thought that I have overstressed the importance of gas composition, and of keeping the content of inerts as low as possible. The accompanying table gives some actual analyses of gases from various sources. In addition to the usual particulars, I have added a figure for calorific intensity. By this is denoted the flame temperature which would be developed if all the heat of combustion were used solely to heat up the products of that combustion when the gas was burnt with just the theoretical amount of air needed for complete combustion.

The figure for specific gravity needs no explanation, but I wish to draw attention to the very damaging effects of the in-

combustible gases, carbon dioxide and nitrogen. You will observe from the tables that, of two gases having a similar calorific value, the one with the lower content of inerts has the higher calorific intensity. Particularly is this noticeable between gases 2 and 6; and consideration of this table will show that carbon dioxide has a greater deleterious effect than has nitrogen.

The presence of excessive carbon dioxide in the gas indicates bad working, in whatever kind of plant the gas is made. In horizontal and vertical retorts, without steaming, it indicates cracked retorts and over-pulling, with consequent indrawing of furnace gases. The effects are bad coke (partly burnt), damaged retorts, blocked pipes, naphthalene, &c., with consequent increased labour costs, *and* less yield of therms per ton of coal.

In the case of steamed vertical retorts or water gas plant, the causes are too low temperatures or excess of steam. Here again a reduced thermal yield is obtained from the fuel, accompanied by a diluted gas liquor, owing to undecomposed steam passing through the plant. So that, as far as the work is concerned, high inerts content of gas means bad working, with increased wear on plant and greater costs.

On the district it means that, owing to the high specific gravity of the gas, difficulty will be experienced in supplying the consumers, as greatly increased pressures will be needed at the governor outlet, and this means greater fluctuations of pressure on the district between the periods of demand. The consumer is also affected in another way; and this is indicated by the difference in calorific intensity. This figure, while not giving in any way an absolute indication of the usefulness to the consumer of gases of different calorific value, does, when comparing gases of approximately the same calorific value, but of different composition, give an indication of their relative efficiencies in use; because, when two gases of the same calorific value show a different calorific intensity, it indicates that, with the one having a higher calorific intensity, less heat is required or is absorbed by the constituents in the products of combustion than with the gas having the lower calorific intensity. It will be apparent from the table that the consumer receives more efficient service from the one of two gases having the lower content of inerts (the calorific value being the same).

No.	1.	2.	3.	4.	5.	6.
Source.	Horizontal Straight Coal Gas.	Vertical Retorts and Steaming.	Coal Gas, *plus* 60 P.Ct. Water Gas.	Coal Gas, *plus* 45 P.Ct. Water Gas.	Coal Gas from Verticals, *plus* 36·3 P.Ct. Water Gas.	Coal Gas from Horizontals, *plus* C.W.G.
CO_2	1·5	4·0	6·3	10·3	4·4	5·2
C_nH_m	3·0	1·4	0·6	1·6	1·9	3·2
O_2	0·2	0·0	0·5	0·8	0·8	0·6
CO	7·0	21·2	21·2	14·7	20·9	6·42
CH_4	29·7	14·68	17·2	20·6	15·3	22·9
H_2	52·4	54·8	49·2	36 8	48·5	35·39
N_2	6·2	3·92	5·0	15·12	8·2	26·29
Total inerts	7·9	7·92	11·8	26 22	13·4	32·09
C.V. gross, B.Th.U.	561·7	425	411·5	411 8	441	434
Calorific intensity, °C.	1891	1936·3	1915·7	1839·1	1912·8	1814
Specific gravity	0·399	0·447	0·493	0·618	0·504	0·602

EXPERIENCES IN DISTRIBUTION.

(By C. Frye, Chief Inspector, Corporation Gas-Works, Dunedin.)

That part of Dunedin known as the Flat has given us a good deal of trouble, owing to the rapid corrosion of mains and services. Cast-iron, Mannesmann tube, and wrought-iron pipe are quickly affected, unless special care is taken; but cast-iron has the longest life. In the early days of white settlement, water used to be level with the tussock and grass, but some years ago the modern system of deep drainage was laid down. Some years ago, while alterations were in progress, I lifted the end of a 3-in. cast-iron main, and with its own weight the pipe broke in the centre. The fracture was of a dull colour, and the tap of a hammer on the pipe gave no ring; but after being exposed to the air for twelve months, the pipe seemed to harden, and gave a better sound when struck.

As many of the services had to be renewed, often in a very short time, we tried various methods of preserving them. The pipes were tarred, some were put in wooden boxes filled with a mixture of sand and tar, in some cases we filled the boxes with a mixture of sawdust and tar, but this was difficult to mix. Owing to the spongy nature of the ground, it was easily disturbed by traffic, and many of the boxes were broken. We then tried double tarring, to which a coating of flies (fine dust from the retort house) was added. This was dirty handling in warm weather. We next tried wrapping the pipes in Hessian after they had been tarred and dusted, and the Hessian was also well coated with tar. These pipes stood the test very well. Of late years we have used "Armco" pipes, tarred and wrapped. These have proved satisfactory so far, but sufficient time has not yet elapsed for us to say definitely that they will have a longer life.

Cast-iron main, after it has been in the ground some years, becomes so soft that it can be cut with a penknife. It appears as if only the carbon was left. In connecting a service to a main in this condition we have often placed some quick setting cement round the connection, to strengthen it.

A quantity of Mannesmann pipe has been laid on the Flat, but its life will be shorter than that of cast iron. When a pipe has been carelessly handled, and the wrapping disturbed, corrosion and, of course, leakage have occurred in a very short time.

In the case of steel pipes, oversight should be particularly given to loading and unloading operations, to see that the wrapping is not damaged. We have noticed in baring steel pipes that, where a white powder is seen on the outside of a wrapping, a leakage will be found close by. Repairs are effected by means of wrought-iron clamps. Leakages are difficult to locate on the Flat, as the ground appears to deodorize the gas (it is almost the same as the natural gas at Hanmer Spring), and owing to the absence of smell, the defective place cannot be located until the hole is actually bared. Another remarkable thing we have noticed, in renewing services, is that sometimes the pipe has actually disappeared. When the ground is opened, the circular hole in which the pipe rested is seen, but the iron has entirely vanished. Even in instances like this, a smell of gas cannot be noticed on the surface.

"PIER" PROCESS OF WATER GAS MAKING.

With the Direct Use of Bituminous Coal.

A section of the report of the Water Gas Committee presented at the last annual convention of the American Gas Association dealt with the use of bituminous coal as water gas fuel—a practice which has been growing all over the United States. It was stated there that, with the application of the "Pier" process, it has been found that the main disadvantages accompanying the use of coal in this way—namely, reduction both in generating capacity and in fuel economy—have been removed; the results in both these respects closely approaching the standard of good coke operation.

According to this report, observations had shown that without this invention the area of activity in the fuel bed extended from the walls about 18 to 24 in. towards the centre; while the centre part had a section of unconsumed fuel and practically no activity. It is to eliminate this condition that the "Pier" process has been devised. It consists of a pier of refractory material, built in the centre of the generator, which cores-out the inactive section of the fire, provides additional radiating wall surface, and gives a more uniformly active fire. In addition to a ring of activity round about the outer wall, there is also a ring of activity about the pier wall; and with proper pier design, it is found that both rings can be caused to merge. The clinker formation is practically flat, and easily removed; while other advantages claimed are a reduction of oil used per 1000 c.ft. of gas (owing to the production of a better quality of blue gas), and a lessening of the amount of fuel blown-over from the fire.

The most recent developments in the "Pier" system form the subject of an article in the "Gas Age-Record," written by Mr. Robert A. Wait, of the Illinois Power and Light Corporation, Chicago. He states that, according to the patentee of the process, Mr. W. J. Murdock (in conjunction with Mr. E. E. Lungren, of Aurora), who is Engineer at the water gas plant of the Western United Utilities Company at Joliet (Ill.), these developments make possible the production of water gas from soft coal at a rate equal to 30 lbs. of coke per 1000 c.ft. of gas made, with an enrichment of about 2·2 to 2·5 gallons of oil, for sending out 480 B.Th.U. gas. The development has been towards a pier which would provide the most surface area, and yet be practical to build and operate. Originally a circular pillar of firebrick was used as a pier; but those now employed at the Joliet plant are triangular in shape, 4 ft. on a side, with the last 4 in. on each edge of the triangle lopped off to obviate inevitable breaking or burning away. These piers are capped by low triangular pyramids, to prevent fuel from depositing on top; the whole structure just reaching the level of the off-take. When charged, the generator is crowded to the highest practical level with the soft coal, entirely submerging the pier. Piers last from six months to a number of years, depending entirely on the quality of material used, the skill of the men installing the system, and the use that the generator is given.

Opinions are that the process will not be successful in small sets, owing both to the restricted operating capacity and to the fact that the space required for the pier leaves too restricted a space for fuel.

Society of British Gas Industries.—We have been asked by the Secretary (Mr. Arthur L. Griffith) to announce that the Council have fixed Wednesday, June 23, for the annual meeting and dinner at the Hotel Cecil. The programme will be carried out precisely as arranged for May 5.

NATIONAL ILLUMINATION COMMITTEE OF GREAT BRITAIN.

Report for the Year 1925.

The following is the report for the year 1925 of Lt.-Col. Kenelm Edgcumbe (the Chairman of the National Illumination Committee of Great Britain), which was presented at the annual meeting of the Committee on Jan. 28 last.

The past year has witnessed the passing of four of those who have built up international reputations in connection with illumination and its related sciences. The Committee wishes to record its sense of loss occasioned by the deaths of Mr. Charles H. Wordingham, Prof. André Broca, Prof. Otto Lummer, and Dr. Hugo Krüss.

In consequence of the establishment of the Sectional Committee on Illumination, mentioned in last year's report, the increasing work of the National Committee relating to problems of standardization and kindred matters has largely been taken over by the Sectional Committee on Illumination of the British Engineering Standards Association, of which the National Illumination Committee has formed the nucleus. This latter Committee, moreover, has representatives on all the Sub-Committees which have so far been formed to deal with specific standardization problems. The National Committee still deals, as hitherto, with all international matters; and it is felt that the broader outlook created by the bringing together of the various technical and industrial interests on the Sub-Committees is making it possible for the National Committee to approach matters of international interest with considerably more confidence and authority than in the past.

The Sub-Committees of the Sectional Committee of the British Engineering Standards Association on Illumination which have already been set up are given below, together with the names of the representatives of the National Committee thereon:

Sub-Committee 39/1.—*Portable Photometers:* Mr. Clark, Lt.-Col. Edgcumbe (Chairman), Mr. Harrison, Prof. MacGregor Morris, and Mr. Walsh.

Sub-Committee 39/2.—*Nomenclature and Symbols:* Lt.-Col. Edgcumbe (Chairman), Mr. Good, and Mr. Walsh.

Sub-Committee 39/3.—*Diffusing Glassware:* Mr. Buckley, Lt.-Col. Edgcumbe, Mr. Gaster, Mr. Harrison, and Mr. Walsh (Chairman).

Sub-Committee 39/4.—*Industrial Reflectors:* Mr. Buckley, Lt.-Col. Edgcumbe, Mr. Gaster, and Mr. Harrison (Chairman).

Sub-Committee 39/5.—*Street Lighting:* Lt.-Col. Edgcumbe, Mr. Gaster, Mr. Harrison, Mr. Paterson (Chairman), and Mr. Walsh.

Sub-Committee 39/7.—*Photometric Integrators:* Mr. Buckley, Lt.-Col. Edgcumbe, Prof. MacGregor Morris, and Mr. Walsh (Chairman).

The Sub-Committee on Portable Photometers has completed a specification which has been issued as B.S.S. No. 230—1925.

The Sub-Committee on Nomenclature and Symbols was able to be of assistance to the British Engineering Standards Association in preparing the Illumination Section of the forthcoming glossary of electrical engineering terms. As a result, a British Standard Glossary of Terms used in Illumination and Photometry has been issued separately as B.S.S. No. 233—1925.

The Sub-Committee on Diffusing Glassware is making very satisfactory progress; and it is anticipated that a specification will be agreed upon in the near future.

The Sub-Committee on Industrial Reflectors has so far confined its attention to one type of reflector, and as a result has issued a specification for an industrial reflector for direct general lighting, as B.S.S. No. 232—1926. The Sub-Committee is now considering the possibility of standardizing a reflector of a somewhat more concentrating type.

The Sub-Committee on Street Lighting, in spite of the obvious difficulties of the problem, is making good progress with a draft specification for various types of urban street lighting.

The Sub-Committee on Photometric Integrators, although appointed early in the year, was only able to commence work towards the end of the year.

Preparation for the meeting of the International Commission on Illumination, which is to take place next year in New York, will necessitate considerable activity by the National Committee during the coming year. In view of the importance of the work, it is hoped that the constituent societies will do all in their power to assist the Committee in sending a thoroughly representative British delegation, so that it may take an effective part in the deliberations of the session.

CHRISMAN WATER GAS CYCLE.

The water gas generating cycle developed by Mr. C. S. Chrisman, of the United Gas Improvement Company, has now been in operation with carburetted water gas apparatus for nearly two years; and at the present time it is being worked by about a score of gas companies. The results which have been obtained by the regular operating men (and not by expert operators in special tests) show, as compared with standard methods of working, a substantial saving in generator fuel, an increase of 10 p.ct. in plant capacity, and equal or better oil efficiency; and further developments at present in progress point to the probability of an additional material saving in generator fuel being secured.

Previous references in the "JOURNAL" have indicated that the Chrisman cycle provides a connection from the base of the generator directly to the washer, so that the gases generated during the down-run can by-pass the carburettor and superheater. The steam is introduced into the generator at the top and bottom, as usual, and cannot affect the proper conditions in the fixing chambers. In an article in the "American Gas Association Monthly," containing a table of comparative operating results with and without the cycle, Mr. Chrisman says the by-passing of the carburettor and superheater by the down-run gases results in these gases entering the wash box at a temperature of about 350° instead of 1350° Fahr.; and the fuel which formerly was burned in the generator to supply this heat to the chequer-brick is saved. The resultant increase in plant capacity from the use of the cycle arises from the fact that the shorter blasting period permits more runs per hour. The shorter blast also leads to fuel savings.

The Chrisman cycle can be applied to existing water gas sets equipped with hot valves and operating mechanism, by simply disconnecting the reverse steam riser and making a by-pass connection from the outlet of the bottom hot valve to the connection between the superheater and washer, with a damper or valve placed in the superheater outlet connection. However, the Chrisman reversing valve (eliminating the use of hot valves) is preferably used on both old and new sets. This valve has two discs on a common stem, actuated by pistons at each end of the stem, giving quick, positive action; and the arrangement is such that greatest pressure is always on the valve that is closed. The position of the valve is on the inlet to the washer; and the blue gas from the bottom of the generator and the carburetted water gas from the superheater enter on opposite sides of the valve, and pass into the dip pipe of the washer.

NAPHTHALENE REMOVAL AND CALORIFIC VALUE.

Before the New Jersey Gas Association, Mr. A. A. Kohr, Chief Chemist to the Seaboard Bye-Product Coke Company, read a paper with the object of showing the very small effect upon the heating value of a gas caused by removing the naphthalene and gum-forming constituents by the Koppers Company's new process, which was installed at the works in August, 1925. This method involves the scrubbing of gas with oil, using a counter-current flow principle, modified so as to ensure proper distribution of very small quantities of oil. The entering oil contains no naphthalene, while the effluent oil has rather high concentrations of this substance. Conditions favourable to the removal of the naphthalene are likewise favourable to the removal of the benzole; and the use of much oil results in a certain loss of heating value, due to the extraction of the benzoles. This point was thoroughly appreciated in the Koppers Research Laboratories; and in the designing of this apparatus efforts were successfully made to keep the oil requirements at an absolute minimum, which makes possible the very low losses in heating value which have been encountered. Under summer conditions, the use of a maximum of 25 gallons of oil per million c.ft. will reduce to only a trace the naphthalene and gum-forming constituents in the gas. With the cooler temperatures in winter, the use of 5 gallons of oil per million c.ft. gives the same result. The actual amount used during last September and October averaged 19 gallons. The Seaboard plant is equipped with a Thomas recording gas calorimeter. The gas sampling line to this equipment is taken off from the main gas stream just prior to the sulphur catch boxes. At this point the gas contains approximately 20 grains of H_2S per 100 c.ft. After passing through the sulphur catch boxes, the gas is compressed to 2 lbs. It then passes through the naphthalene apparatus, and to a testing station located about a mile from the works. At this point average hourly samples of the gas are taken, and the calorific value of the samples determined by means of a Junkers calorimeter. The Thomas calorimeter sampling line contains a small purifier to remove all traces of H_2S from the gas before testing. A table setting out the hourly figures of a typical day's operation with the naphthalene removal apparatus at work shows an average calorific value of gas of 539·8 B.Th.U. on the Thomas calorimeter before the naphthalene plant, and of 539·3 B.Th.U. on the Junkers calorimeter after the naphthalene apparatus.

REGISTER OF PATENTS.

Purifying Gases.—No. 249,312.

Reeson, J. N., of Melbourne, and Moss, W. L., of Camberwell, Victoria.

No. 6655; March 11, 1925.

This invention is for the removal of H_2S, CS_2, &c., from coal gas and other industrial or waste gases. The objects are: Removal of the impurities in a commercial condition; regeneration of the purifying solution; special means for preparing the solution; recovery of the sulphur in its elementary condition; and low first cost and operating cost of the plant and process.

The gas is passed through a number of suitable vessels, and in doing so comes in contact with, and is washed by, a neutral solution of iron hydroxide.

In the preparation of this solution an iron compound is used, preferably the sulphate or the chloride, to which has been added any substance having the property of precipitating iron as hydroxide either directly or as an oxidation product such as the hydrates or carbonates of potassium sodium or ammonia and organic bases such as pyridine and quinoline and the like. An essential feature is that, in the preparation of the solution, substances having a solvent action in neutral solution on hydrate of iron are employed—such as salicylic acid, para hydroxybenzole acid and phthalic acid and the alkali salts, poly-atomic alcohols and their derivatives including the glycols and glycerine, citric acid, and citrates.

During the process, the prepared solution of iron hydroxide absorbs hydrogen sulphide, reducing the iron compound to a lower state of oxidation and forming iron sulphide; and further, the bisulphide of carbon and thiophene are removed partly by the suspended sulphur obtained during the regeneration of the solution, and partly as thiocarbonate which becomes oxidized in the subsequent regeneration of the solution. As an example, a suitable washing solution may be prepared by adding to a 2 p.ct. solution of sulphate of iron 1 to 5 p.ct. of one of the substances specified as solvents, neutralizing with soda ash and oxidizing by aerating with air.

The solution may be used in any type of gas washer; and the process of purification and regeneration can be performed continuously or intermittently.

Regeneration can be accomplished by aeration by means of air or oxygen at a low or high temperature, and preferably under pressure. In this the air oxidizes the precipitated sulphide of iron with deposition of sulphur (which remains in suspension) and formation of polythionic acids, which consume a portion of the alkali used; and the iron purifying solution is formed and oxidized and is then ready for further treatment of gas. Further alkali is added in quantity sufficient to keep the solution neutral, and further iron salt replaces the small amounts removed with the sulphur. The sulphur can be removed and further treated as required. Sulphur acids gradually accumulate in the liquor, which is ultimately treated to recover these as thiosulphate of soda and sulphate of soda.

The patentees do not confine themselves to the above-mentioned chemicals or the various steps arranged in the process, as they may be varied for the particular purpose, without departing from the scope of the invention.

Meters.—No. 250,073.

Wilson, W., of The Hague.

No. 17,753; July 10, 1925.

This invention has for its object to provide an improved construction of gas meters of the type having, besides the usual counting mechanism indicating the total quantity of gas which has passed, a second counting mechanism which can be set back to zero and which indicates the quantity of gas which has flowed through the meter during a given interval.

The invention is characterized in that the second counting mechanism gives its indication in the form of a directly legible number consisting of consecutively assembled numerals; and it can be set back to zero from the outside of the meter by a depressible knob located in a case to which access is only obtained by a key.

The second counting mechanism comprises a number of dials with figures; a port being made for each of them in the wall of the meter.

Each dial axle is provided with a cam, and all the cams are positioned in such a manner that they can be acted upon by a sliding plate depressed by the knob.

Weighting of Gasholders.—No. 250,159.

Dempster, R. & J., Ltd., Scott, J. W., and Sheeran, A. J., all of Manchester.

No. 4627; Feb. 18, 1926.

This invention relates to the weighting of gasholders, in conformity with the pressure desired and which may be applied to existing or new holders.

The weights take the form of containers for solids or liquids; the containers being supported by angle-irons or brackets inside (preferably) the inner lift of the holder. Pipes may be fixed through the crown to dip into the container, for filling them or syphoning off the contents; and a release valve, operated externally by a chain, may be fitted in the base of each container.

Burners.—No. 250,281.

Helps, G. of Nuneaton.

No. 23,459; Oct. 4, 1924.

This invention relates to gas burners of the type in which a regulating disk on the burner head is adjusted simultaneously with the turning on or off of the gas.

The patentee claims "the combination with a gas cock carrying a nipple of a tube or rods secured thereto around the nipple, a cam operated by the turning of said tube or rods, and a regulating disk actuated by the cam." Also "the combination with a gas cock carrying a nipple of a toothed wheel secured thereto and meshing with a toothed wheel carried by a cam, and a regulating disk acted on by the said cam."

Gas Fires.—No. 250,500.

Carpenter, C., and South Metropolitan Gas Company, both of Old Kent Road, S.E. 15.

No. 32,037; Dec. 18, 1925.

This invention relates particularly to improved means for minimizing the quantity of air induced to flow over the radiants, by the provision of additional air inlets to the flue, in the form of one or more passages at the rear or sides. Preferably the inlet or inlets is or are located near the base of the fire, and the passages are formed integral with the casing.

PARLIAMENTARY INTELLIGENCE.

HOUSE OF LORDS.

Progress of Bills.

Chorley Corporation Bill: Reported, with amendments.

Special Orders.

The Special Orders proposed to be made on the applications of the Leatherhead Gas and Lighting Company and the Tawe Vale Gas Company have been referred to the Special Orders Committee.

The Brentwood Gas Order, 1926, was approved on April 19, on the motion of Viscount Peel.

HOUSE OF COMMONS.

Progress of Bills.

Halifax Corporation Bill: Committed.

Helensburgh Gas Order Confirmation Bill: Read the third time, and passed, without amendment.

Darwen Corporation Bill: Reported, with amendments.

Ascot District Gas and Electricity: Reported.

Gas Regulation Act.

Copies were recently presented of drafts of Special Orders proposed to be made by the Board of Trade under the Act, on the applications of the Leatherhead Gas and Lighting Company, Tawe Vale Gas Company, and the Chapel Whaley and District Gas Company.

On the motion of Sir Burton Chadwick, approval was given to the Special Order of the Brentwood Gas Company.

CHORLEY CORPORATION BILL.

The Unopposed Committee of the House of Lords (presided over by the Lord Chairman), on Tuesday, May 18, ordered this Bill to be reported for third reading. There are no substantial alterations in the clauses relating to the gas undertaking (see "Journal" for Jan. 20, p. 161), except that which gives the Corporation power to compel consumers to repair piping or appliances on their premises which are reported to be in a dangerous condition. The London, Midland, and Scottish Railway Company petitioned in order to secure exemption from the application of this clause; and it has been agreed that the clause shall not apply to the property of the Railway Company other than dwelling-houses. A similar clause was discussed early this year before Mr. J. F. Ronca (Director of Gas Administration at the Board of Trade) in the case of the Clitheroe Corporation Gas (Extension) Order. On that occasion (see "Journal" for Feb. 24, p. 487) the Railway Company opposed, and urged that they had their own staff for the proper maintenance of gas piping and appliances at their stations, depôts, &c.

HACKNEY BOROUGH COUNCIL BILL.

On Tuesday, May 18, the Unopposed Committee of the House of Lords (presided over by the Lord Chairman) ordered this Bill to be reported for third reading. Among its provisions are clauses relating to the construction of electrical sub-stations under streets, and the carrying-out of other works; and the Gas Light and Coke Company

were among the petitioners who asked for protective clauses. The Gas Company, however, did not appear when the Bill was in Committee in the House of Commons, but petitioned again in the House of Lords (presumably to allow negotiations to proceed), and agreement was arrived at before the Bill reached Committee. As a result, certain protective provisions applying to the Metropolitan Water Board, which had already been inserted, were extended to apply to the Gas Company. It is provided that the Borough Council are to give to the Company 28 days' notice of their intention to carry out the construction of electrical sub-stations under streets, and are to submit plans and descriptions of the proposed works, so that the Company may give notice of objections, by reference to the effect of such works on either the existing gas mains and pipes, or any which it may be necessary to lay within a reasonable time. Similar conditions are to apply to some other works which the Borough Council may carry out. Provision is made for the settlement of differences by arbitration.

DARWEN CORPORATION BILL.

The Unopposed Committee of the House of Commons, presided over by Mr. J. F. Hope (Chairman of Ways and Means), on Tuesday, May 18, ordered this Bill to be reported for third reading. The Bill is of an omnibus character, and contains a few ordinary clauses for regulating the supply of gas (see "JOURNAL" for Jan. 20, p. 161), to which no substantial alterations have been made.

KIDDERMINSTER AND STOURPORT TRAMWAYS BILL.

The Unopposed Committee of the House of Lords, presided over by the Lord Chairman (the Earl of Donoughmore), ordered this Bill to be reported for third reading on Tuesday, May 18. The Bill, as originally deposited, sought to authorize the Kidderminster and Stourport Electric Tramway Company, among other things, to construct new tramways and to reconstruct an existing tramway. The Stourport Gas Company petitioned in order to secure protection for their property against damage caused by the construction of the new tramways; but, the promoters having decided subsequently to delete from the Bill the provisions relating to the construction of those tramways, the Gas Company withdrew the petition.

SOUTHERN RAILWAY BILL.

This Bill authorizes, among other things, the widening of existing lines, and the making of junctions, spurs, &c., on the Southern Railway. A petition was deposited by the Mid-Kent Gaslight and Coke Company, for the purpose of securing protective provisions against damage to their property which might be caused by the construction of the railway works authorized by the Bill. This petition, however, was withdrawn; it being agreed to insert in the Bill the ordinary protective clause which is usually applied in such cases. On Tuesday, May 18, the Unopposed Committee of the House of Commons, presided over by Mr. J. F. Hope (Chairman of Ways and Means), ordered the Bill to be reported for third reading.

MISCELLANEOUS NEWS.

GAS METER TESTING IN BIRMINGHAM.

Annual Report of the Official Inspector.

In his report to the Birmingham City Justices' Gas Meter Testing Committee for the year ended March 31 last, Mr. Frederick Colburn states that the number of meters tested totalled 120,183, compared with 126,770 last year—a decrease of 6587. The fees charged amounted to £7060, which, together with £55 received from the sale of one obsolete test holder, brings the income of the Department up to £7115—a decrease of £45 compared with the previous year. The expenditure amounted to £2853, showing a credit balance of £4261, which has been carried to the Borough Fund.

Appended to the report are statistical tables giving an analysis of the results of the testings. Of the meters tested, 4339, or 3·6 p.ct., were rejected, as against 2·97 p.ct. last year. Of 10,501 wet meters, 469, or 4·6 p.ct., were rejected; and of 109,682 dry meters tested, 3870, or 3·5 p.ct., were incorrect. Of the 4339 meters rejected, 1901 were more than 2 p.ct. fast, 1083 were more than 3 p.ct. slow, while 590 were rejected for unsoundness—225 external and 365 internal. Of 340 meters submitted for re-verification and certificates, 215, or 63·2 p.ct., were incorrect. Of 53,352 new meters submitted, 37,696 were of the standard sizes, as against 25,152 last year. Repaired meters numbered 66,491, or 55·3 p.ct. of the total tested. The highest monthly percentage of rejections was 4·5, and the lowest 2·6.

THE NATIONAL STRIKE DOCTRINE.

From an Address by the Right Hon. J. R. Clynes, M.P.

As President of the National Union of General and Municipal Workers, the Right Hon. J. R. Clynes, M.P., delivered an address on Whit Monday, when this body were in congress at Bournemouth. Naturally, first place was given by him to the industrial conflict which is now uppermost in all people's minds. From what he had to say on this subject, the following is taken:

In industrial conflicts, as in war between nations, there are losses which victors and vanquished alike must share in common. From such struggles there are no gains—unless the combatants gain some valuable lessons from these unfortunate encounters. When first I knew of the intention to declare a national strike, I expressed in the proper quarter my opposition to this policy, and put before the Executive of our Union alternative plans for substantial financial support to the miners, supplemented by efficacious industrial action likely to afford the necessary resistance to the mine-owners' attack.

In previous discussions on such a policy as a national strike, I have stated that it would be futile and wasteful, because it never could succeed, and has not succeeded when tried elsewhere. It raises false issues, and the real merits of any question to be settled are completely submerged. A proper industrial purpose is widely represented as some nefarious political design. Confusion takes the place of that sane and systematic action which has met with so much success in cases where well-organized workers have pressed their claims in particular trades, and have proven the value of well-directed trade union power and pressure.

The failure of a national strike is mainly due to the fact that the ground is shifted from a struggle between employers and trade unions to a fight between masses of men on the one hand, and on the other the Government claiming to act for the nation and backed by unlimited resources of every financial and material kind. A national strike never can be complete. If all workers suddenly ceased to labour, a few hours would see the country without food or the means to transport it. Such an instantaneous shock would inflict starvation first and most upon the poorest of the population, who have no reserves. Riot or disorder would not feed them; and even in a country governed through democratic institutions, an appeal to force would be effectively answered by superior force.

A national strike alters the whole material and mental position of the people. Considerable groups of workers are soon detached from the main body, and can be induced or compelled to serve on the side of a Government. Speedily there develops the worst of all forms of class war—namely, war between sections of the working-class itself. Manifestations of solidarity are admirable; but solidarity without wisdom becomes worthless, and the heroics of the first few days' fighting fade into the scared and subdued murmurs of defeated and distracted men.

Having said this, I think it is essential that the nation should understand how much the Government is at fault in creating the conditions which led to the strike, and should know why the trade unions resolved to risk and stake so much in their determination to prevent further wage reductions. . . . The miners were actually locked-out. Is a lock-out of a million men in an essential trade to be viewed as legal and proper, and to pass without censure, while a strike in a number of trades begun as an act of retaliation must be denounced as unconstitutional and revolutionary? One thing which distinguishes liberty from slavery is the worker's right to sell or withhold his service. The employer exercises a similar right when he refuses to engage men except upon his own terms.

It is idle to say that men who struck work broke agreements and violated contracts. Contracts are usually broken by men who want to pursue some selfish end for personal gain. But the men who struck work committed an act in keeping with the better sides of our British character, and showed their devotion and sacrifice for a cause. As an act of policy, their conduct ought not to be repeated; but as a proof of readiness to help their fellow workers and stand in support of men who are wronged, their conduct deserves the praise of all who wish to see the standard of living raised. It would be unwise ever to repeat what has been done; and we shall prove to be very short-sighted if we do not learn some priceless lessons for the future. The national strike for only a few days no doubt involved the workers in the loss of more than £20,000,000 in wages alone. A fraction of such a sum spent wisely in well-directed political action would soon place the workers in possession of the enormous power which the Government was able to direct against them in the greatest struggle which so far we have known.

In his conclusion, Mr. Clynes said: The supremacy of any section is fatal for community well-being. The dictatorship of part of a nation may be pleasing for a period, but it must prove to be ruinous in the end in its relation to the enduring prosperity of any country.

GAS REGULATION ACT APPLICATIONS.

There have appeared in the "London Gazette" the following notices regarding applications to the Board of Trade under the Act.

AMENDING ORDERS.

North Middlesex Gas Company.

The Middlesex County Council having applied for an Amending Order revising the powers of charging authorized by the North Middlesex Gas (Charges) Order, 1921, the standard price which the Board propose to authorize in lieu of the existing standard price of 10d. per therm is 13·2d. per therm.

Uxbridge, Maidenhead, Wycombe, and District Gas Company.

The Middlesex County Council having applied for an Amending Order revising the powers of charging authorized by the Uxbridge, Wycombe, and District Gas (Charges) Order, 1921, the standard price which the Board propose to authorize in lieu of the existing standard price of 18·4d. per therm is 15·2d. per therm.

The Hereford City Council have, on the recommendation of the Gas Committee, decided to apply to the Ministry of Health for sanction to borrow the sum of £1500 for new mains and services.

IMPERIAL CONTINENTAL GAS ASSOCIATION.

ANNUAL ORDINARY GENERAL MEETING.

The Ordinary General Meeting of the Association was held on Wednesday, May 12, at the Cannon Street Hotel, E.C.—Sir Charles J. Jessel, Bart., in the chair.

The Chairman: I can only congratulate those present to-day on coming here, in spite of all the difficulties in their way. By our Act of Parliament we are required to have twenty shareholders at the meeting, either by proxy or actually present, representing £20,000 of stock; and I may say that we have taken precautions to fulfil this condition. We have proxies, I believe, to the extent of £79,000. Therefore we are perfectly safe in this respect; and so I formally declare this to be a fully constituted meeting, and call upon the Secretary to read the notice convening the same.

The Secretary (Mr. F. H. James) thereupon read the notice convening the meeting.

The Register of Proprietors.

The Chairman: I now beg to move that the Common Seal be affixed to the Register of Proprietors. That is a mere formality.

The seal having been affixed,

The Chairman proceeded: I next beg to move:

> That the interim dividend at the rate of 5 p.ct., less tax, paid in respect of the year ended Dec. 31, 1925, be hereby confirmed.

The Deputy-Chairman (Col. H. LeRoy-Lewis, C.B., C.M.G., D.S.O.) seconded the motion, which was unanimously agreed to.

The Chairman then called upon the Secretary to read the Auditors' certificate on the accounts submitted; and this having been done,

The Chairman proposed:

> That the accounts for the year 1925 and the scheme prepared in accordance with the Companies' Clauses Consolidation Act, 1845, showing the profit available for the purposes of dividend, which the proprietors have before them in the form of the profit and loss appropriation account, be taken as read.

This was agreed to.

The Accounts.

The Chairman: Ladies and gentlemen, I think now I will pursue the course that I have adopted in former years, of briefly taking you through the accounts; and then if any shareholder wishes to ask any question on them, I will reply to the best of my ability. On the right-hand side of the profit and loss account, you will see that the net profit from stations is increased by some £9435. This, I think you will agree with me, is extremely satisfactory, considering the various adverse factors which we encountered during the year. In the first place, the Belgian exchange rate, which averaged in 1924 96·12, in 1925 was 101·78. Then we had a very poor return from our residuals—an experience which has been common to gas undertakings in all countries. There was a great fall in the price of coke, sulphate of ammonia, and tar; and the real improvement which took place in the output of our electricity works (which, as you see from the report, amounted to no less than 16·7 p.ct.) is probably more or less the cause of our increased profit.

The question of dividends.

I should, at this point, like to say a word or two with reference to a letter that came into our office from a member of the Stock Exchange, who, again, as a gentleman did last year, asked us whether we were in a position to maintain a dividend of 10 p.ct. in future years. I can only repeat what I said a year ago—that there is no magic about a 10 p.ct. dividend. I never promised that for the rest of the life of the Association we should be able to pay a 10 p.ct dividend, neither has anyone else in a responsible position done so. Everything, as you know, depends upon factors which no mortal can control. It is true that in the early part of the year the Belgian exchange looked as if it was going to be stabilized at about 107; and, of course, these accounts do not deal with the horrible break that has taken place of late. Therefore it may be that the net receipts from our stations in Belgium will be greatly decreased from what they have been during the past year; but I need hardly point out to those of you who have gone through our balance-sheet that we have made, as far as we possibly can, ample reserves against this. I should like also to say, with respect to the question of dividend, that the traditional policy of the Association has been one and the same throughout its history—namely, one of strictly conservative finance. The strength of this Association has been, not in the dividends that it has paid, but the dividends that it has earned, and has not paid. It is in consequence of this policy that we have been able to come through a great war without very much loss; and I trust that by continuing to pursue it we may overcome the dangers of an uneconomic peace. Then, again, as a factor on our side, I am glad to say that the first three months of this year show that we are improving in our working results; and this will have a bearing on the profit that will be made during the current year.

Cie. Continentale du Gaz.

You will notice, proceeding to consider the right-hand side of the profit and loss account, that "Dividends on investments, interest, discounts, &c.," show an improvement of £40,000. No less than about £25,000 of this is due to larger receipts from our investment in the Cie. Continentale du Gaz. At the same time, of course, the French exchange has been very much against us, because an interim dividend of 6 p.ct. paid in April last year produced £35,750 (the French franc being 90·76½), whereas this year a similar dividend (with the French franc at 139·38) produced only £23,279. The real explanation of the £25,000 gain to which I have referred—with the exchange at 90, as compared with 75 in the preceding year—is the largely increased amount of capital which we had in the Cie. Continentale du Gaz. I may say here that this Company is doing splendidly, and was able to renew its concession for the supply of electricity at Lille in February of this year—the final stage being the signature of the President of the French Republic. This gives the Company a monopoly of electricity supply in Lille for forty years.

Depreciation of sundry assets.

While on this point, it will be convenient for me to say something with regard to an item on the other side of the profit and loss account—"Depreciation of sundry assets, written off." This is accounted for by the practice of the Association, when any investment depreciates in value, to write it off in our ordinary profit and loss account. Should any investment increase in value, of course, no notice is taken of it. For nearly a quarter-of-a-century I was the representative of the Imperial Continental Gas Association on the Board of the Lille Electricity Company, which is now absorbed by the Compagnie Continentale. That Company began originally with a very small station, which was operated by gas engines in the middle of the town of Lille. It was a very small affair in every way. Consideration was later given to the advisability of building a large station on the outskirts of the town, so that when the concession reached its termination we should be in a position to compete with two or three other companies who were also provided with power stations outside the town. Then, of course, arose the question of finding the money to build this station; and we, quite rightly I think, came to the conclusion that it would be a great deal better, instead of increasing the capital, to get the people of Lille to subscribe towards this expense by investing in *obligations*, or debentures, in the Lille Electricity Company. We made several issues—I cannot remember now how many—and these were absorbed by the bankers in the town. However, in 1912, some 3,000,000 frs. to 4,000,000 frs. more were required in order finally to equip the station, and, when it came to the point, we were informed by the bankers that the people of Lille were absolutely gorged with *obligations* of the Lille Electricity Company, and they would not take any more. I got my Board here to acquire this issue *en bloc*. It yielded 4½ p.ct., and we thought it a good investment. At the same time, it was absolutely necessary that the funds should be forthcoming. It was in these circumstances that we took up *obligations* to the total of 3,500,000 frs.; and they cost the Imperial Continental Gas Association the sum of about £139,000. Even taking the exchange as it was on Dec. 31 last, £120,000 of this £139,000 had gone; and the *obligations* stood at that date in our books at £19,000. We therefore cannot lose much more. But this is the sort of thing that can happen, and has happened, with investments where it is a question of fixed return. Our interest in the Cie. Continentale du Gaz still stands below its market value in our books; and no writing-down has had to take place with respect to the ordinary shares in that Company. I merely wished to explain how and why this wretched item has appeared in the accounts year after year since the war.

The German compromise.

The next item on the side of the account with which I have been dealing, you will see, is "Revenue proportion of German Compromise, £200,285." As to this, a shareholder has asked where the interest comes in. The interest that I mentioned at our last meeting as having been received is there. That is to say, there is £80,000 odd; but, of course, on the other side is the income-tax relating to this, so that the net amount is only £64,000 odd after recovery of tax over-deducted by Clearing Office at time of payment. The whole of the sum awarded to the Association by the German Compromise Agreement has now been received. As you will recollect, the amount of the agreement was £1,600,000, as follows:

German liquidators' charges refunded	£50,000
Capital proportion of balance	1,058,268
Revenue proportion of balance	491,732
Gross total	£1,600,000

After deduction of the Clearing Office Commission, the capital accretion available amounted to £1,081,561; and this has been dealt with as follows:

Special dividend June 15, 1923,	12 p.ct.	£237,113	7	8
,, ,, May 20, 1924,	10 ,,	197,600	0	0
,, ,, May 26, 1925,	19½ ,,	385,320	0	0
Proposed ,, ,, May 20, 1926,	8½ ,,	167,960	0	0
Total by way of special dividends,	50 p.ct.	£987,993	7	8
Transferred to Proprietors' Fund		£93,567	12	4
Total capital accretion		£1,081,561	0	0

The object of the transfer to Proprietors' Fund was to have available a sum out of which a distribution could be made, in the event of the depreciation in the French and Belgian currencies following in the footsteps of the mark. In the event of your agreeing to the proposed 8½ p.ct. distribution, the proprietors will receive the final instalment of the 50 p.ct. capital accretion distribution which I forecasted in 1921. The revenue proportion of the Compromise amounting, after deduction of the Clearing Office Commission, to £479,439, has been merged in the Association's general revenue, as follows:

Dec. 31, 1923	£179,799	3	7
Dec. 31, 1924	179,783	14	3
Dec. 31, 1925	119,856	2	2
	£479,439	0	0

Against these amounts there have been, of course, charges at the appropriate rates for income and corporation profits taxes. Out of

the net sum remaining, the centenary bonus dividend was paid, and the balance has been utilized for the general purposes of the business.

ITEMS OF EXPENDITURE.

Turning to the other side of the profit and loss account, you will see the expenses in London, pensions, audits at stations, &c., are up £2000. This is on account of the centenary bonus we gave our staff. I have had a letter about the corporation profits tax, because a year ago I said that was the last occasion on which the item would appear. As a matter of fact, it would have appeared anyhow, because we and the Authorities differed to the extent of £2 5s. 9d., and, worse than that, to the extent of about £400. An Indian railway in which we had an investment successfully appealed against an assessment for corporation profits tax; and the Authorities then gave notice that we should be assessed to the extent of £399 for all the back tax we have not paid. That has been allowed for in these accounts, so I hope I can safely say to-day that we shall never again see the item of corporation profits tax. Interest on debenture stock I need not deal with; and the general amortization account you know must go on. Depreciation of sundry assets I have already referred to. Coming to the item "Renewals fund, £100,000," I will explain the policy of the Board with regard to that. When we had to consider the break-up value of our assets in Belgium, we put them at a certain figure. We then discovered that, through the depreciation of the franc, these assets were by no manner of means covered by this figure; and so we have taken £100,000 in order to save the amortization fund from having to supply this during the term of our contracts. Legal charges are down, because the 1924 accounts included expenses in connection with an old French law suit, which arose when we had stations of our own in France. We have put £12,000 more than last year to the Exchange and Contingency Account as a reserve which I have already explained.

STAFF ENDOWMENT FUND.

The final item on this side is "I.C.G.A. Staff Endowment Fund, £2000." We have put this to good purpose in the first place by getting a nomination at Christ's Hospital. It seemed to us that the best way of doing something for our staff was by ensuring the education of at least one boy; and a boy has already gone to Christ's Hospital under this scheme. He is the son of a member of our staff who was killed in the war; and I hope you will think, as we do, that we have used the money to good purpose. ["Hear, hear."] Then there is the balance of profit for the year, £180,008. This, of course, appears to be £50,000 less than for 1924; but, as a matter of fact, the normal income was about £49,000 up. The explanation is the abnormal charges to renewals fund, &c., to which I have already made reference.

THE BALANCE-SHEET.

Turning now to the balance-sheet, on the right-hand side the item of "works, mains, &c., expended to Dec. 31, 1925, £3,510,773," is £159,000 up, owing to the expansion of business. It is principally on account of electricity supply. I daresay you know that electricity supply, when it expands, is a very expensive thing, and requires a great deal of capital. "Freehold land forming the sites of works" has gone down, because, owing to the depreciation of the franc, we had to write down £2100 from the site of one of our stations. "Stocks at stations" also are down, owing to the decrease in the value of raw materials and residuals, and, in addition, we made a drastic writing-down of old stores. "Cash at stations, £16,898," is down £22,601, because we are being very careful, with the falling franc, to get every shilling over directly we can, and therefore there was less left at the stations. "Cash at bankers' in London and at London office, £1626," is down; but, of course, you will see that we had on loan in London £101,000. "Sundry debtors" I need not deal with, and "Loans to foreign gas and electricity companies" have disappeared.

NEW OFFICES.

I must keep you for just one more moment to explain the item of "Freehold property in London and abroad." Older proprietors will remember that we sold to very great advantage our former offices at 21, Austin Friars; but one of the conditions of the purchase by Lloyds Bank was that we were to get out by a certain date. Therefore we were rather hurried in choosing another set of offices, and the one we did select proved at once somewhat undesirable, because it was too small. Our Accountant, I think, when he has his full staff, has to send his typist out into the passage; and the Registrar's Department is divided into two portions—one on the ground floor, and the other down in the cellars. This arrangement has been altogether inconvenient and expensive to run; and it is also undesirable because the spot is somewhat removed from railway stations and from places where our staff can lunch. I was, however, able to obtain a site in Devonshire Square; and I do not think I made a very bad bargain, because within 48 hours of my closing at the price which was agreed upon, I was offered £2000 profit for my bargain. It seems, therefore, that I did not do any harm over the purchase. We are building offices there more suitable to our needs; and another desirable thing that has taken place is that we have been able to dispose of our old offices, so that we are not only "on with the new love," but we are "off with the old." Of course, we have lost the money we spent in adapting our present premises to our wants—it has been written off long ago—but otherwise we get out of the transaction without any loss; and I think that the quiet and beauty of this old-fashioned square, near Liverpool Street Station, will appeal to our staff and ourselves, as well as to any shareholders who may do us the honour of coming to see the new offices when they are finished. "English, Colonial, and Indian securities" are down £154,000; but, as a matter of fact, we have not sold a single security. We had Treasury Bills which lapsed, and were not being renewed at that particular moment. The question of depreciation I have already dealt with.

FIGURES ON THE OTHER SIDE.

On the other side of the balance-sheet, the capital stock issued has not been altered; and the same remark applies to the 3½ p.ct. debenture stock, because none was offered at a price which could be entertained. The item of "Sundry stockholders, amounts unclaimed," has gone down nearly £1000; but there are still a few proprietors who prefer to leave their money with us, rather than to claim it. There is, I think, nothing more to which I need call your attention, until I come to "Proprietors' Fund, £93,567." The reason why this appears as a separate item is that it is part of the accretion to capital, and it is necessary to keep it apart because if the proprietors ever decide to distribute this money among themselves it will be divided-out without payment of income-tax. It is a little reserve, amounting to about 5 p.ct., which can be divided at any time, and will be payable without deduction of income-tax. That is why it has to be put in as a separate item.

THE STAFF.

I do not think I ought to sit down without saying a few words with respect to the good work done by our staff both at home and abroad. Our Brussels Station was severely handicapped towards the close of the year by the serious illness of that very able and loyal servant of ours, M. de le Paulle, the Manager there. I am, however, glad to say that when Col. LeRoy-Lewis and I were in Brussels last week we found him—I will not say quite recovered—but on the way to complete restoration to health; and he has taken up his office again. I hope that he will prove to be again the useful servant that he has been. While he was absent the responsibilities of the station fell upon the shoulders of M. Périer, who during this period had to deal with negotiations of a very delicate character with one of our Communes. However, they have not yet culminated, and therefore nothing more need be said about them now. At home I can only say that we have again to thank Mr. James for the able work he has done in the past year, during a period of great anxiety and of much difficulty. I feel that I am expressing the views of every member of the Board in saying that in Mr. James we have the right man in the right place; and I hope that he may be long spared to help us in the direction of the Association's affairs I also wish to thank the rest of the staff, whom I consider to be second to none in training and ability. They are always ready to give loyal service in the best interests of the Association. [Applause.]

THE DIVIDENDS.

All that remains for me is to move, as I now do:

> That the sum of £167,960 received from the realization of the German assets, being an accretion to capital which has been realized and turned into money, be dealt with as profit and applied in payment of a special dividend for the year 1925, at the rate of 8½ p.ct. per annum on the nominal amount of the issued capital stock of the Association, such dividend to be paid on the 20th of May, 1926, upon the holdings of capital stock as registered in the books of the Association on the 20th of April, 1926.

The DEPUTY-CHAIRMAN: I beg to second that.

The motion was put to the meeting, and carried unanimously, without discussion.

The CHAIRMAN: I next have to move:

> That upon the holdings of capital stock as registered in the books of the Association on the 20th of April, 1926, there be also paid on the 20th of May, 1926, less income-tax at 4s. 1½d. in the pound, a final ordinary dividend for the year ended the 31st of December, 1925, at the rate of 5 p.ct. (actual), making, with the interim dividend of 5 p.ct. (actual) paid in November, 1925, a dividend of 10 p.ct. for the year, leaving £70,026 9s. to be carried forward to the next account.

The DEPUTY-CHAIRMAN seconded this, and it was agreed to.

The CHAIRMAN: I have to move now:

> That the accounts, together with the scheme for the appropriation of the profits, which have been submitted, be received, adopted, and entered upon the minutes.

The DEPUTY-CHAIRMAN seconded this, and it was carried.

RE-ELECTIONS AND THANKS.

The CHAIRMAN: The next business is the re-election of the retiring Directors. In doing this, we make it a rule to say little beyond moving and seconding the resolution; but before I am re-elected, I should like to explain that the direction of an Association like this is a very different thing from the administration of an English gas company, which has to deal with capital expressed in sterling, receives a revenue expressed in sterling, and has a perpetual franchise. We unfortunate people are directing a Company which has an English capital, receives its revenue in an unstable and uncertain currency, has to pay its dividends in sterling on a sterling capital, and has not a perpetual franchise. It has not a freehold like an English gas company, but a leasehold, which is subject perhaps to the whims and crotchets of some Communal Council, and is very often the mere plaything and sport of politicians in these foreign lands. I therefore want to point out that our task is not the ordinary one of seeing that the carbonizing returns are in proper order, and that so many thousand cubic feet of gas have been produced, and that sort of thing. We have very anxious times in considering what policies to pursue on certain occasions which never have to be dealt with at all by the directors of an English gas or electricity company. I say this to make clear to you the necessity of having on your Board men of some standing and ability, and who we think may be able to help us in the direction of the Association's affairs. [Applause.]

The DEPUTY-CHAIRMAN: Owing to the self-denying ordinance that our Chairman imposes on us, which forbids us to "blow our own trumpets," I shall say nothing about the qualifications and abilities

of our Chairman, but will confidently recommend to the shareholders the resolution: "That Sir Charles James Jessel, Bart., be re-elected a Director of the Association."

The Right Hon. Sir Guy D. A. Fleetwood Wilson, G.C.I.E., K.C.B., K.C.M.G., seconded the resolution, which was unanimously adopted.

The Chairman: I beg to thank you for this renewal of your confidence. I have had your suffrages for over thirty years. I now move: "That Sir Henry Birchenough, Bart., K.C.M.G., be re-elected a Director of the Association." He is unfortunately unable to be here; but he makes his excuses. He is marooned in a rather out of the way part of the country, and found it impossible to get up.

This was carried, as was also the re-election as a Director of Mr. Harold Godfrey Palmer.

Mr. T. Bromhead Bassett (the retiring Auditor) was subsequently re-appointed, on the proposition of Mr. E. Rowe, seconded by Mr. C. Holmes Hunt.

Mr. W. Northover: Before we separate, a very pleasurable duty falls to my lot, which must not be omitted in any circumstances. It is to move that the best thanks of the meeting be given to our Chairman for the very able and satisfactory statement that he has put before us; and also to the Directors for their services. It is a very great achievement, enhanced by the anxious period through which we have passed. The Chairman has our entire and unqualified approval. ["Hear, hear."]

The resolution was cordially agreed to.

The Chairman: On behalf of my colleagues and myself, I thank you for this mark of your confidence in us.

MONTEVIDEO GAS AND DRY DOCK COMPANY, LTD.

An Increase in Dividend.

The Fifty-Fourth Ordinary General Meeting of the Company was held on Tuesday, May 18, at Dashwood House, Old Broad Street, E.C.—Mr. Frank H. Jones (the Chairman) presiding.

The London Manager and Secretary (Mr. Henry Kearns) read the notice convening the meeting and the report of the Auditors; and the minutes of the last meeting were taken as read, as also were the report of the Directors and the statement of accounts for the year ended Dec. 31. The last named showed that, after providing for interest on debenture stock and other charges, there was a balance at net revenue account of £44,288, including the sum of £14,397 brought forward from the previous year.

The Chairman, at the outset, referred to the resignation from the Board of Mr. John Mews, which unfortunately was due to illness. Mr. Mews had, he said, been a Director of the Company for more than eighteen years. The Board much appreciated his services, and felt sure all present would join them in expressing the hope that his health might soon be restored. As stated in the report, also, Mr. Charles Hunt had felt it necessary, owing to advancing years, to relinquish the Chairmanship of the Company; and his colleagues had honoured him (Mr. Jones) by electing him to fill the vacancy.

SALES OF GAS 6¼ P.CT. UP.

Proceeding to move the adoption of the report and accounts, the Chairman said it was a satisfaction to the Board to slightly increase the dividend to 5 p.ct. for the year, free of tax, as compared with 4 p.ct. for the four previous years. This dividend had been fully earned; and they were, in addition, able to increase the undivided balance carried forward. The two accounts previously appearing as the reserve account and the contingency account had been amalgamated to form a general reserve; and the sum of £1760 had been transferred from the profit of the year, increasing this general reserve to £72,000. The shareholders would be asked to sanction the transfer of £1434 to the pension fund, which would bring this fund up to £7000. The Board had transferred £1000 to deferred maintenance, which now stood at £20,500; but he would like to make it clear to them that all their property and plant had been brought up to a thoroughly efficient condition, so that this amount could not be regarded as representing work which had been deferred, but rather as a fund to provide against the time when, owing to reorganization, it would be necessary to scrap obsolete and under-sized plant no longer suitable to present-day needs. It would be noticed, on the credit side of the balance-sheet, that the Directors had transferred the items of cookers on hire, furniture, and property in Montevideo used as offices and showrooms, &c., to capital account, to which it rightly belonged, and had written-off depreciation £8596, or £2103 more than in the previous year. The capital expenditure during the year amounted to £51,640. In addition to the sum spent to Dec. 31 on the erection of a new gasholder, heavy amounts had been expended on mains, cookers, and meters, to meet the growth in business. The sales of gas showed the satisfactory increase of 6·57 p.ct., which rate of increase had been exceeded for the three months to March 31—the latest date to which they had had complete returns. In eight years, the sales of gas had increased by more than 100 p.ct., the number of consumers nearly 50 p.ct., and the average consumption per consumer over 38 p.ct. During the year, they had pulled up 4 miles of small mains, and laid 9¼ miles of larger diameter pipes. Some 6 miles of services had been laid, and 880 houses connected. This large increase in business had brought about a gratifying reduction in the capital expended per million c.ft. of gas sold, which he considered to be a real test of the wise expenditure of capital combined with efficiency in a gas undertaking. Although coal had cost less during the past year, the loss on residuals had more than swallowed up the amount saved, and was the only setback in the accounts. Expenditure showed an apparent increase of £15,000; but this was largely due to the accounts being rendered in a different form this year—amounts formerly charged to profit and loss being on this occasion debited to revenue account. The revenue from the dock had increased; but after providing for all expenditure, the profit had been small. A satisfactory feature of the accounts was that exchange had been more favourable; the loss amounting to £4142, as compared with £12,394 in the previous twelve months. During the year, an action brought by the Tax Office had been decided against the Company for the payment of Absentee Landlords' Tax. The law as passed was undoubtedly intended to exempt a Company like theirs; and exemption, in fact, was granted them by Government resolution. They had appealed, as it was inconceivable that a Company carrying out a public service, spending large sums in wages and the purchase of materials in the country, and employing hundreds of its inhabitants, could be regarded as an absentee landlord. In July of last year their London Manager visited Montevideo. He made an inspection of the property, and conferred with Mr. Whyte (Manager out there) as to the best means of meeting the increasing business; and he would ask him to give his impressions of that visit. The Board had arranged for Mr. Whyte to come to London, and would have liked him to attend this meeting; but owing to the erection of the gasholder not having been completed, he had deferred his visit until a little later in the year. The shareholders would be asked, before the proceedings terminated, to agree to the sub-division of the unissued £20 shares into shares of £1 each.

Mr. Edgar Horne seconded the motion for the adoption of the report and accounts, which was agreed to without discussion.

On the proposition of the Chairman, seconded by Mr. E. B. Read, it was resolved that a dividend be declared on the ordinary stock for the half-year ended Dec. 31 of 3 p.ct., free of income-tax, making, with the interim dividend previously paid, 5 p.ct., free of income-tax, for the year 1925. Also that the sum of £1434 be transferred from the profits of the year to the pension fund, increasing this fund to £7000.

The Chairman said that in the early part of the year Mr. Mews resigned his position on the Board; and it was essential that they should have in his place somebody who understood a business such as theirs, which was not quite like the ordinary English gas administration. The Board had accordingly selected Mr. Read, a gentleman who had been a shareholder for some years, and who was well known to him (the Chairman). Since he had been on the Board he had proved very useful. He moved that Mr. Edward Bruce Read, a fully-qualified stockholder, be elected a Director of the Company.

Mr. Horne seconded this; and it was carried.

The Chairman remarked that the Director retiring by rotation was Mr. Charles Hunt, who, though he had relinquished the chairmanship, owing to advancing years, wished to retain his Directorship. He had been on the Board for 21 years, and had been Chairman for one-half this period, or perhaps longer. He had done a great deal of good work for the Company.

Mr. Hunt's re-election as a Director was agreed to, on the motion of Mr. C. Holmes Hunt, seconded by Col. A. G. Hipwell, C.B.; and the Auditors (Sir Laurence Halsey and Mr. William C. Sneath) were reappointed, on the proposition of Mr. R. W. Western, seconded by Mr. J. E. Wimshurst.

The staffs in London and Montevideo were heartily thanked for their services, on the motion of the Chairman, seconded by Mr. H. J. Price.

Mr. Kearns, in response, gave some impressions of his recent visit to Montevideo. He said that the first of his impressions was the extraordinary growth and apparent prosperity of the city. He found all the Company's plant, property, and machinery in an excellent state of efficiency. The new gasholder had been commenced; and the new settings of retorts, which now filled the capacity of the retort house, and also the boosting plant, purifiers, station meter, and other apparatus, were installed and working; while the removal of small mains no longer capable of carrying the gas required was progressing, and larger mains being installed, which would greatly improve the supply of gas all over the city. With regard to the staff, he considered that in the General Manager (Mr. Whyte) they had a live man who was open to receive suggestions and to put them quickly into practice; and he thought they were being well served by the chiefs of all departments.

Thereafter a resolution was passed on the motion of the Chairman, seconded by Mr. Horne, that each of the 2904 unissued shares of £20 each of the Company be sub-divided into 20 shares of £1 each, ranking *pari passu* in all respects with the existing issued £541,920 ordinary stock of the Company.

The meeting closed with a vote of thanks to the Chairman and Directors, which was unanimously accorded, on the motion of Mr. Price, seconded by Col. Hipwell.

There was an accident at the Preston Gas-Works on Friday, May 21. The roof of an old building collapsed without warning, and in its fall brought down portions of the wall. The building was about 150 ft. long and 65 ft. wide, and it was situated on the north side of the works. Hundreds of tons of debris fell inside the building, which was used for storing steam wagons and materials, and also contained a small amount of plant. One of the side walls fell outwards, and broke a steam main and a gas main. There was a considerable escape of gas, but luckily this was speedily checked. There was no personal injury.

IN GLASGOW DURING THE STRIKE.

The delivery of gas for the period of the strike was 203,880,000 c.ft., and for the corresponding period last year it was 206,180,000 c.ft. The general strike did not interfere with this delivery, except that it was considered desirable to decrease the pressure at night. Pressure on the district was reduced one hour earlier each night, commencing on the 5th inst., the new minimum being five-tenths less than normal, and reached gradually by 11.30 p.m. On the 12th inst. it was decided to commence this reduction in pressure another half-hour earlier—viz., 11 p.m. Normal minimum is 3 in., and is reached by 12.30 a.m. This restriction in pressure is, of course, put into operation with the view of conserving coal stocks, and will be governed by the stoppage in the coal industry.

One of the chief difficulties with which the Department has had to contend has been lack of transport. The railway stoppage has prevented the dispatch of coke and other bye-products, and the receipt of stores generally. Stocks of general stores, such as machine oil, and things of that kind, were satisfactory, and, as a matter of fact, could have been replenished locally if there had been any shortage. Considerable expense was involved in the works in storing coke and other bye-products. Ashes which normally are taken from the works in railway trucks, and dumped outside, had to be moved to temporary dumps in various parts of the works.

A local Fuel Overseer has been appointed, and supplies of coke were restricted to 50 p.ct. of the quantity of pre-strike orders. Bakers were allowed their normal quantity; and to permit of our motor transport being used as much as possible for transferring coke and ashes to dumps in the works and for other purposes, coke customers were asked to send vehicles for supplies.

There were some deliveries by road of appliances for the Distribution Section from makers; but generally the supply of appliances and fittings was cut off.

In the Street Mains Section, twenty horse-drawn vehicles are usually hired under contract from a local contractor, and these vehicles were not available during the strike. Included in this fleet of hired transport are vans for delivering material to branching squads working in the district, and carts for taking surplus soil, &c., from pipe tracks to dumps. The motor lorries of the Street Mains Section, assisted by part-time loan of vehicles from the gas-works, managed to surmount this difficulty. In the Central Stores Section of the Distribution Department our own fleet of motor vehicles, along with hired transport, carried on normally.

In the Reinstatement Section, which is responsible for the repair of foot pavements and other property damaged by mains and services gangs, ten masons struck work on the 4th, and resumed on the 5th inst. Thirteen plasterers in the same section came out on the 5th, and resumed on the 6th, with one exception, who, we understand, was intimidated by some people in the district in which he lived. The painters in this section stopped on the 16th inst., but the leading hand and one non-union man remained at work.

The largest number of men who withdrew their services from any section of the Department was in the meter repair workshops, where, out of a staff of 151 (including 103 tinsmiths), 57 tinsmiths, members of the National Amalgamated Union of Sheet Metal Workers and Braziers, struck work on the evening of the 10th inst., and resumed on the 13th inst. Three brass finishers in that section also struck work on the night of the 10th, but they resumed on the morning of the 12th.

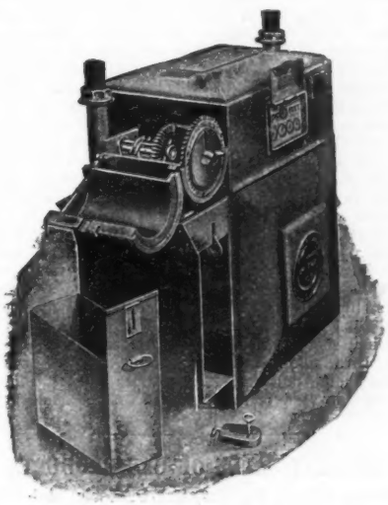
The area supplied by the Department measures about sixteen miles from North to South and about eighteen miles from East to West. With the tram service completely suspended, and the bus service severely limited, the amount of time spent by meter readers and prepayment meter collectors in walking naturally cut down the number of readings and collections. The average number of meters read per day is usually 3200; and during the strike, even with an extra reader to assist, this was reduced to 3142. The number of prepayment collections per day was 3297, against a normal figure, for the number of collectors employed, of 3393.

The amount of time spent in walking has involved loss in the Gasfitting and Maintenance Sections. Maintenance fitters usually employed in the outlying districts were transferred to districts nearer the depôt from which they worked.

Evidently there was a good deal of uncertainty in the policy concerning tradesmen in gas undertakings, for the Department's employees who were called out by local Trade Union officials were very soon back at work. This was effected presumably by the local branch of the union getting into touch with the Trade Union Congress in London. In no case where a man went on strike was his place filled by voluntary labour, as the classes of trade involved did not necessitate such a step.

Dukinfield Gas Balance-Sheet.—The net profit for the year ended March 31 of the Borough of Dukinfield Gas Department was £1603; the gas rental having amounted to £18,828, as compared with £16,990 in the previous year. The report of the Manager (Mr. George Lindley) states that the sales of gas totalled over 99 million c.ft., an increase of 3½ millions. For the year ended March, 1925, there was a loss of £300.

Fire at the Poole Gas-Works.—Considerable damage was caused by fire on May 15 at the new Poole Works of the Bournemouth Gas and Water Company. It occurred in a tar dehydration plant used for preparing road tar. It is thought that a quantity of the tar must have boiled over, and in some way been ignited. The man in charge, Robert Dyke, did his utmost to turn off the various controlling valves, but he was overcome by the fumes and had to be medically treated. A policeman on duty during the fire was also affected. The Company's men came forward splendidly when they knew of the outbreak, and afforded great help to the local fire brigade. The iron-work of the building housing the plant was considerably damaged.



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COAL TRADE IN THE MIDLANDS.

From Our Local Correspondent.

It has become almost a misnomer to speak of the coal trade. If the trade is not entirely in suspense, it has shrunk to the slenderest proportions. From a market point of view, it has ceased to have any significance. Local supplies were temporarily reinforced by the release of consignments which were in transit when the general strike began. These were not very considerable, however, forwarding having been expedited as much as possible before traffic was stopped. Industrial activities which depend upon raw fuel—like brick-making and glass-making—appear to be well insured. The position varies in the iron and steel trade. In the nature of things it is impossible to stock supplies adequate to carry on smelting and forge and foundry work for any length of time. The precautions taken when the present trouble threatened were nothing like so extensive as those of last summer. Some ironmasters thought the menace would pass as it passed last July; others were careless of the upshot owing to the unremunerative level to which trade had sunk.

As was foreseen, the volume of demand is very small now that the blow has fallen. There is a certain amount of trade to be done by those who have fuel; and as the output is very small relatively to the rate of consumption in the engineering and general metal working branches, higher prices are obtainable for crude iron and steel sections.

Stocks of household coal are being released very sparingly by the control. In Birmingham, where an understanding was arrived at that the price should not exceed 2s. 3d. per cwt., the limit has been raised to 2s. 6d. in view of the increased cost of transport and handling.

CURRENT SALES OF GAS PRODUCTS.

The London Market for Tar, Tar Products, and Sulphate.

LONDON, *May 25.*

There is little doing in pitch at the present time, although there are still one or two inquiries in the market for prompt shipment. In view of the partial shutting-down of coke ovens, and consequent reduction in the quantity produced, there appears to be no reason for prices to fall.

Creosote is firm and steady at about 7¼d. per gallon net at makers' works.

Tar spirits are in demand, pure benzole and pure toluole being firm at about 2s. 3d. per gallon. Solvent naphtha, 95/150, is steady at about 1s. 10½d. per gallon.

Pyridine bases is rather firmer at about 19s. per gallon.

Tar Products in the Provinces.

May 25.

There is practically nothing fresh to report on the Tar Market, and prices remain unaltered.

The average values for gas-works products during the week were: Gas-works tar, 46s. to 51s. Pitch, East Coast, 67s. 6d. to 70s. f.o.b. West Coast—Manchester, 61s. to 63s. 6d.; Liverpool, 62s. 6d. to 65s.; Clyde, 67s. 6d. to 70s. 6d. Benzole, 90 p.ct. North, 1s. 8½d. to 1s. 9½d.; crude, 65 p.ct. at 120° C., 1s. 1d. to 1s. 2d., naked at makers' works; 50-90 p.ct., naked, North, 1s. 8½d. to 1s. 9½d. Toluole, naked, North, 1s. 8d. to 1s. 9d. nominal. Coal-tar crude naphtha, in bulk, North, 8d. to 8½d. Solvent naphtha, naked, North, 1s. 5d. to 1s. 6d. Heavy naphtha, North, 11½d. to 1s. 0½d. Creosote, in bulk, North, liquid, 6½d. to 6¾d.; salty, 5⅞d. to 6d.; Scotland, 5⅝d. to 5⅞d. Heavy oils, in bulk, North, 6⅝d. to 7d. Carbolic acid, 1s. 4d. to 1s. 5d. prompt. Naphthalene, £11 to £14; salts, £4 to £5, bags included. Anthracene, "A" quality, 2½d. per minimum 40 p.ct., purely nominal; "B" quality, unsaleable.

CONTRACTS OPEN.

Resetting Retorts.

The Milford Haven Urban District Council are inviting tenders for the resetting of a bed of six retorts. [See advert. on p. 417.]

Cast-Iron Pipes, Pipe Laying, and Boiler.

Tenders are invited by the Gas Department of the Droitwich Corporation for the supply of cast-iron pipes, pipe laying, and vertical boiler. [See advert. on p. 417.]

Danish Gas Company's Preference Capital.—The Directors of the Danish Gas Company have notified the shareholders of their desire to redeem the whole of the preference shares of the Company at £10 8s. for each £10 share. This sum is to include any accrued dividend to May 31, and is to be paid in sterling.

South Suburban Stock Issue.—With regard to the recent offer of £400,000 of 5 p.ct. ordinary stock in the South Suburban Gas Company, we learn that tenders at an average price of 99·05 p.ct. have been accepted, and letters of allotment have been posted. The dividend on the Company's ordinary stock for 1925 was 6½ p.ct.

Primitiva Gas Company of Buenos Aires, Ltd.—The accounts for the year ended Dec. 31, which are to be presented to the shareholders at the meeting to-day (May 26), show receipts amounting to £135,099, and a profit for the year of £56,385. Adding the balance from the previous year, gives a disposable total of £95,762, which the Directors have allocated as follows: To contingency reserve, £50,000; and to depreciation and renewals account, £45,762. The erection of an installation of Glover-West vertical retorts, of a capacity of 3 million c.ft. a day, is well advanced; and it is expected that the plant will be put into operation before the end of this year. Various changes have taken place in the Board.

Davis Gas Stove Company and the Strike.

Except for transport difficulties as a result of the stoppage of the railways, the effect of the general strike upon the Davis Gas Stove Company, Ltd., was negligible. They were in the fortunate position of retaining the whole of their workers; and right through, until the last day of the strike, every man and woman was in his or her place. Production was certainly hindered by the reduction of the supply of power by 50 p.ct.; and the question arose as to how the Company could best keep faith with their people, who were so splendidly supporting them, under such conditions, which were the outcome of the stoppage in the mining industry, rather than of the general strike. Eventually the foundry departments were put on to three days' cast per week, and the other departments were closed down at mid-day. Provision was, however, made for the social life of the employees during the absence involuntarily forced upon them, by opening the club, tennis courts, bowling green, and sports field. The Company were in the fortunate position of having good stocks of raw materials, and but for the restriction of the power supply could have carried on "business as usual" for a considerable period. The complete cessation of railway transport was partially counterbalanced by an extensive scheme of road transport, as a result of which the Company were able to dispatch as many as fifty lorry loads a week to destinations practically all over England. Generally speaking, the lorry drivers met with little opposition; and those who were obstructed continued to report for duty as if nothing had happened, and to deliver to customers and bring back as return loads many supplies that were required to enable the Company to continue production. The Company are issuing an interesting little brochure, in which their activities during the strike are set out; and it is understood that a copy will gladly be sent to any gas official asking for it.

Coal Oil Extraction, Ltd., is the title of a private Company registered to carry on business as carbonizers of coal, distillers of tar, &c. The nominal capital is £1000 in £1 shares.

Hong Kong and China Gas Company, Ltd.—During the past year the gas sold at Hong Kong and Kowloon was 6·76 and 8·12 p.ct. respectively more than in the preceding year. The Company's contract for public lighting has been renewed for a further period of five years, to July, 1930. The balance of net revenue enabled the Directors to recommend the payment of a dividend at the rate of 10 p.ct. per annum, free of income-tax.

Darwen Gas-Works Results.—Speaking in the Darwen Town Council, Councillor G. Pickup (the Chairman of the Gas Committee) said the year's working of his Department showed a profit of £1005. They used 17,372 tons of coal, or 461 tons less than in the previous year, at an average cost of 24s. 8d., a decrease of 1s. 4d. per ton. They manufactured 247,907,000 c.ft. of gas, an increase of 10,190,000 c.ft.; and the yield per ton was 14,270 c.ft., an increase of 940 c.ft. per ton. The total carbonizing cost for the year showed a reduction of £2358. This was a large reduction, accounted for by the fact that in the previous year the chamber installation was out of action for a considerable time. The total gas sold was 218,610,000 c.ft., an increase of 11,589,000 c.ft. The unaccounted-for gas had decreased from 11·36 to 10·48 p.ct. The Committee had made no increase in the price of gas during the year.

The Blackburn Corporation have asked the Gas Committee to give an estimate of the cost of heating the Public Halls and Sessions House by gas, in place of steam as hitherto.

The Hebden Bridge and Mytholmroyd Gas Board have decided to appoint an official whose duty shall be the periodical inspection of all gas fittings in use in the Board's district.

At their recent annual meeting, the Holsworthy Gas and Electric Supply Company, Ltd., declared a dividend of 4 p.ct. This is the first dividend the Company have declared for ten years.

At a meeting of the Accrington and District Gas Board, on May 19, it was decided to offer 500 tons of coal (nuts) to retailers in the area, to be sold at not more than 2s. per bag, for sick and necessitous people only.

The Tiverton Town Council have adopted the recommendation of their Lighting Committee that a retort charger and coal-handling plant be purchased; and application is being made for sanction to borrow the necessary amount.

The Sowerby Bridge Gas Committee visited the gas-works on May 20, when Mr. A. W. Bissell, the Engineer and Manager, and Councillor J. Gledhill, Chairman of the Committee, acted as guides. Mr. Bissell explained the process of manufacture.

The Lyme Regis Town Council have referred to the Electric Lighting Committee for consideration and report a letter from Mr. R. C. Johnston, of Westminster, who suggested that the Authority might like to purchase the gas-works, in order to combine it with the electric light undertaking.

There was a gross profit of £22,602 on the Blackpool Corporation Gas Department for the last municipal year, the gross profit estimated being £16,355. The estimated income was £176,969 and the actual receipts were £179,152. The expenditure was estimated to be £160,614, but it was £151,550, due to economical working. The disposable balance, estimated at £355, was £10,628.

In connection with a recent successful gas appliance exhibition held at Dewsbury under the auspices of the Corporation Gas Department, to mark the inauguration of new plant, a cookery competition among schoolgirls was organized. The prizes in this were awarded to the successful girls recently. The judge was Miss Lina Parkyn, who was the lecturer and demonstrator at the exhibition. The prizes were presented by Alderman J. McCann, Chairman of the Gas Committee and ex-Mayor of Dewsbury.

STOCK MARKET REPORT.

WITH the collapse of the general strike extremely optimistic views prevailed on the Stock Exchange; and when business opened last week, prices which had fallen during the previous week rebounded so quickly that bargain snatchers had very little opportunity of benefiting thereby. Later on, when it became clear that the coal mining deadlock was to continue, the enthusiasm subsided somewhat.

At the beginning of the week there was a large demand for gilt-edged securities; Conversion 3½ p.ct. rising no less than ⅜ on Monday. Although business eased off at the close of the week, all the prices of Trustee Stocks showed improvements, and it was increasingly difficult to obtain stocks that yielded a clear 5 p.ct. Home Rail debentures and guaranteed stocks all benefited, and the popular Industrials—Tobaccos and Artificial Silks—were well supported. Even Iron, Coal, and Steel received some attention.

Gas Stocks had quite a good week. It will be seen from the table that Alliance and Dublin ordinary, Bristol 5 p.ct. maximum, Gas Light ordinary, South Suburban ordinary, and the two stocks of the Tottenham Company were all marked-up. The accounts of the Primitiva Company, published last week, show that the Company is making good progress. A matter of interest is the proposal to consolidate the two 4 p.ct. debenture stocks of the Company—viz., the Buenos Ayres (New) and River Plate issues. The large drop of 12 points *ex* div. in the Imperial Continental capital stock is, of course, justified by the 13½ p.ct. (actual) dividend being paid. An increased dividend of 3 p.ct. (actual), making 5 p.ct. for the year, as compared with 4 p.ct. for the corresponding period, has been declared by the Montevideo Company. A study of the accounts reveals a very satisfactory state of affairs. The Company propose to convert 2904 unissued £20 shares into 58,080 £1 shares, which will rank *pari passu* with the ordinary stock of the Company.

Issue.	Share.	When ex-Dividend.	Dividends. Prev. Hf.Yr	Dividends. Last Hf. Yr.	NAME.	Quotations. May 21.	Rise or Fall on week.	Transaction Lowest and Highest Prices.
£			%p.a.	% p.a.				
171,978	Stk.	Feb. 4	5	5	Aldershot 5 p.c. max.	74—77	..	..
322,992	,,	,,	4	4	Do. 4 p.c. Pref.	69—74	..	..
1,551,868	,,	Apl. 1	6¼	6¼	Alliance & Dublin Ord.	73—76	+1	73½—75
374,000	,,	Jan. 7	4	4	Do. 4 p.c. Deb.	60—65	..	..
300,000	1	May 6	1/7½	1/7½	Bombay, Ltd.	⅞—1	..	..
170 000	10	Mar. 4	8½	8½	Bournemouth 5 p.c.	12—13	..	..
425,050	10	,,	7	7	Do. B 7 p.c.	12—12½	..	..
275,000	10	,,	6	6	Do. Pref. 6 p.c.	11—12	..	..
50,000	Stk.	Jan. 7	3	3	Do. 3 p.c. Deb.	55 58	..	..
162,025	,,	,,	4	4	Do. 4 p.c. Deb.	75—78	..	..
214,740	,,	Mar. 18	12	12	Brighton & Hove Orig.	167—172	..	..
214,200	,,	,,	9	9	Do. A Ord.	130—135	..	..
1,287,500	,,	Feb. 18	5	5	Bristol 5 p.c. max.	87—88*a*	+2	..
855,000	,,	Mar. 18	8	7	British Ord.	98—103	..	99—99½
100,000	,,	Jan. 7	7	7	Do. 7 p.c. Pref.	117—122	..	..
120,000	,,	,,	4	4	Do. 4 p.c. Red. Deb.	69—74	..	..
100,000	10	Dec. 17	8	6	Cape Town, Ltd.	6¼—7½	..	..
100,000	10	Apl. 22	4½	4½	Do. 4½ p.c. Pref.	5⅞—6⅞	..	..
150,000	Stk.	Jan. 7	4½	4½	Do. 4½ p.c. Deb.	68—73	..	..
626,860	,,	Feb. 18	6	6	Cardiff Con. Ord.	96—99	..	..
237,860	,,	Jan. 7	7½	7½	Do. 7½ p.c. Red. Deb.	98—101	..	..
157,150	,,	Mar. 4	5	6¼	Chester 5 p.c. Ord.	87½—92½*b*	..	..
79,185	1	Apl. 22	†2/-	†2/-	Colombo Ltd. Ord.	23/—30/-	..	..
24,495	1	,,	1/4½	1/4½	Do. 7 p.c. Pref.	20/—22/-	..	..
1,513,380	Stk.	Mar. 4	5½	5½	Commercial 4 p.c. Cap.	77—82	..	77-79
560,000	,,	,,	5/3/4	5/3/4	Do. 3½ p.c. Cap.	76—81	..	..
475,000	,,	Dec. 17	3	3	Do 3 p.c. Deb.	55—58	..	..
800,000	,,	Oct. 8	—	4	Continental Union, Ltd.	32—37	..	32
200,000	,,	Mar. 4	7	7	Do. 7 p.c. Pref.	85—88	..	85
737,150	,,	Mar. 4	6½	6½	Croydon sliding scale	95—98	..	97½—98
403,100	,,	,,	5	5	Do. max. div.	79—83	..	80¼—80¾
492,370	,,	Mar. 4	6	9	Derby Con.	107—109*c*	..	..
55,000	,,	Dec. 17	4	4	Do. Deb.	74—76*c*	..	..
209,000	,,	Mar. 4	5	5	East Hull Ord. 5 p.c.	86—89	..	..
50,000	,,	Dec. 17	—	5	Eastbourne 5 p.c. Deb.	93—98	..	..
1,002,180	10	Apl. 1	†6	†4	European, Ltd.	5—6	..	5½
18,788,960	Stk.	Feb. 18	5½	4/17/4	Gas Light & Coke 4 p.c. Ord.	80—82	+2½	78½—80¾
2,600,000	,,	,,	3½	3½	Do. 3½ p.c. max.	58—61	..	58½
4,157,020	,,	,,	4	4	Do. 4 p.c. Con. Pref.	75—78	+2½	75—77½
5,602,620	,,	Dec. 17	3	3	Do. 3 p.c. Con. Deb.	57—60	..	58½—60
181,315	,,	—	—	—	Do. 6 p.c. Br'tf'd Rd. Db.	102—104	..	..
130,000	,,	—	10	10	Do. 10 p.c. Bonds.	..	..	..
42,000	,,	—	7½	7½	Do. 7½ p.c. Ilford Deb.	..	..	..
82,500	,,	Mar. 18	6¾	6¾	Hastings & St. L. 5 p.c. Conv	88—93	..	..
258,740	,,	,,	5½	5½	Do. 3½ p.c. Conv.	68—73	..	..
70,000	10	Sept. 24	†10	†10	Hongkong & China, Ltd.	20-21	..	..
173,200	Stk.	Mar. 4	10	10	Hornsey Con. 3½ p.c.	66—68	..	..
1,976,000	,,	May 20	10	‡10	Imperial Continental Cap.	125—130*	−12	126—140
226,170	,,	Feb. 4	3½	3½	Do. 3½ p.c. Red. Deb.	69—72	..	..
235,242	,,	Mar. 18	6½	6½	Lea Bridge 5 p.c. Ord.	95—100	..	..
2,127,340	,,	Feb. 18	5½	5½	Liverpool 5 p.c. Ord.	79—80*b*	..	..
600,000	,,	Mar. 18	7	7	Do. 7 p.c. Red. Pref.	101½—103½*b*	..	..
165,736	,,	Feb. 18	9	8	Maidstone 5 p.c. Cap.	115—120	..	..
63,480	,,	Dec. 17	3	3	Do. 3 p.c. Deb.	54—59	..	..
75,000	5	Dec. 3	†7	†6	Malta & Mediterranean	4½—5	..	..
541,920	Stk.	May 20	†4	†6	Montevideo, Ltd.	73—76*	−2½	73—76
2,061,315	,,	Mar. 4	5	5	Newcastle & Gateshead Con.	71½—72*d*	..	72⅝
360,929	,,	,,	4	4	Do. 4 p.c. Pref.	75—76*d*	..	..
529,705	,,	Dec. 17	3½	3½	Do. 3½ p.c. Deb.	69—71*d*	−2	..
15,000	,,	Mar. 4	11¼	11¼	North Middlesex 10 p.c.	155—160	..	..
91,580	,,	,,	8⅝	8⅝	Do. 7 p.c.	112—117	..	..
300,000	Stk.	May 6	9	7	Oriental, Ltd.	95—100	..	97- 98
188,120	,,	Jan. 7	7½	7½	Plym'th & Ston'house 5 p.c.	110—115	..	..
60,000	50	Mar. 4	14	14	Portsea Island B	90—95	..	..
100,000	50	,,	13	13	Do. C	88—93	..	..
2,289,909	1	—	—	—	Primitiva Ord.	10/6—11/6	..	10/6—11/4½
282,200	100	Dec. 1	4	4	Do. 4 p.c. Red. Deb.	84—86	..	..
600,000	Stk.	Jan. 21	4	4	Do. 4 p.c. Red. Deb. 1911	66—68	..	..
180,305	,,	Dec. 17	4	4	Do. B. Aires 4 p.c. Rd. Db.	66—68	..	..
256,847	,,	,,	4	4	Do. R'r P'te 4 p.c. Rd. Db.	66—68	..	..
150,000	10	Mar. 18	6	6	San Paulo 6 p.c. Pref.	7¼—8	..	..
125,000	50	Jan. 4	5	5	Do. 5 p.c. Red. Deb.	43—46	..	..
270,000	Stk.	Mar. 18	5½	6	Sheffield A	98—100*e*	..	..
419,968	,,	,,	5½	6	Do. B	98—100*e*	..	..
1,047,000	,,	,,	5½	6	Do. C	98—100*e*	..	..
90,000	10	June 11	6	4	South African	5—7	..	..
6,509,895	Stk.	Mar. 4	5	7	South Met. Ord.	91—93	..	91½—93
1,895,445	,,	Jan. 7	3	3	Do. 3 p.c. Deb.	56—59	..	..
734,000	,,	Mar. 4	6½	6½	Do. 6½ p.c. Red. Db.	102—104	..	..
91,500	,,	Mar. 4	8½	8½	South Shields Con.	117—119*d*	..	..
1,187,795	,,	Mar. 4	6½	6½	South Suburban Ord. 5 p.c.	98—101	+1	97½—100
368,837	,,	Dec. 17	5	5	Do. 5 p.c. Deb.	94-97	..	..
647,740	,,	Mar. 18	5	5	South'mpton Ord. 5 p.c. max	77—80	..	78½
121,275	,,	Jan. 7	4	4	Do. 4 p.c. Deb.	69—74	..	..
250,000	,,	Mar. 4	7	7	Swansea 7 p.c. Red. Pref.	99—102	..	..
200,000	,,	Dec. 17	6½	6½	Do. 6½ p.c. Red. Deb.	100—102	..	..
120,000	,,	Feb. 18	7½	7½	Tottenham District A 5 p.c.	108—113	+1	..
882,275	,,	,,	5½	5½	Do. B 3½ p.c.	88—91	+1	88
180,000	,,	,,	28/4	5½	Do. 5½ p.c. Pref.	101—103	..	..
181,355	,,	Dec. 17	4	4	Do. 4 p.c. Deb.	74—77	..	..
258,251	,,	Mar. 18	5	5	Tynemouth Con. and New	67- 68*d*	..	..
197,294	,,	Mar. 4	6¾	6¾	Uxbridge, Maidenhead, & Wycombe 5 p.c.	90—95	..	..
88,330	,,	,,	5	5	Do. 5 p.c. pref.	85—90	..	..
91,800	,,	,,	6¾	6¾	Do. 5 p.c. Maidenh'd	87—92	..	..
30,000	,,	Mar. 4	8½	8½	Wandsworth, Wimbledon, and Epsom— Wandsworth A 5 p.c.	128—128	..	..
255,636	,,	,,	7	7	Do. B 3½ p.c.	103—108	..	..
412,450	,,	,,	5/19/0	5/19/0	Do. C and New	88—93	..	89
352,000	,,	,,	6¾	6¾	Wimbledon 5 p.c.	97—102	..	98
98,000	,,	,,	7½	7½	Epsom 5 p.c.	105—110	..	..
88,416	,,	Jan. 7	3	3	3 p.c. Deb.	55—58	..	..

Quotations at :—*a.*—Bristol. *b.*—Liverpool. *c.*—Nottingham. *d.*—Newcastle. *e.*—Sheffield. *Ex. div.
† Paid free of income-tax. ‡ Plus 8½ p.ct. p.a. special dividend.

The following transactions were recorded during the week:

On Monday, Croydon maximum dividend 80¼, 80¾, Gas Light and Coke 78½, 79, 79½, 79⅝, 3½ p.ct. maximum 58½, 4 p.ct. preference 75, 76¾, 3 p.ct. debenture 58½, Imperial Continental 140, Newcastle 72 3/16, Primitiva 11s. 3d., 11s. 4½d., South Suburban 97½d. Supplementary prices, Brighton and Hove 5 p.ct. debenture 92½, Romford original (10 p.ct.) 10 1/16.

On Tuesday, Alliance and Dublin 73½, Croydon sliding-scale 97½, 97⅝, 98, maximum dividend 80¼, Gas Light and Coke 78½, 78⅝, 79, 79½, 79¾, 4 p.ct. preference 75, 76, 3 p.ct. debenture 58½, 59½, Montevideo 76, Primitiva 11s., South Metropolitan 91½, South Suburban 5 p.ct. 98, 99, 100. Supplementary prices, Brighton and Hove 5 p.ct. debenture 95, Croydon 7½ p.ct. preference 102.

On Wednesday, Alliance and Dublin 75, British 99, 99¼, 99½, Commercial 4 p.ct. 77, Gas Light and Coke 79, 79½, 80, 80¼, 4 p.ct. preference 76, 77, 77¼, 3 p.ct. debenture 58¾, 60, Imperial Continental 140, Primitiva 11s., 11s. 1⅛d., 11s. 3d., 11s. 4½d., South Metropolitan 93, Tottenham "B" 88, Wandsworth (Wimbledon stock) 98. Supplementary prices, Barnet "D" 102, Wandsworth 3½ p.ct. 89.

On Thursday, European 5½. Gas Light and Coke 80½, 80¾, 80⅞, 80⅝, 80¾, 3 p.ct. debenture 59¼, Imperial Continental 126, 126½, 127 *ex* div., Montevideo 73 *ex* div., Oriental 98, Primitiva 10s. 6d., 10s. 9d., 10s. 10½d., 11s., 11s. 3⅛d., South Metropolitan 92, 92½. Supplementary prices, Horley District Addl. "B" 91.

On Friday, Commercial 4 p.ct. 79½, Continental Union 32, 7 p.ct. preference 85, Gas Light and Coke 79½, 79⅝, 80, 80¼, 80¼, 80¾, 4 p.ct. preference 76, Oriental 97, Primitiva 10s. 6d., 10s. 9d., South Metropolitan 92½, 93, Southampton 5 p.ct. 78½. Supplementary prices, Barnet 4 p.ct. debenture 74½, 75½.

Monetary conditions were quite satisfactory; and it has been stated that we can look forward to a reduction in the Bank Rate when a solution is found for the coal problem. With the decline in market discount rates it was inevitable that Treasury Bills should be placed at a lower rate, the average being £4 6s. 2.41d. p.ct. Four p.ct was the usual rate for new loans in Lombard Street, but towards the close balances were offered at 3½ p.ct.

Although efforts are being made to restore the French franc to something of its lost value, there seems no likelihood, in the absence of drastic action with regard to the nation's finances, that there will be any permanent improvement. During the fall the rate reached 175 to the £. After recovering to 148½ there was a further depreciative movement to 150½. Belgian francs closed at 149¾, and Italian lire are again back to 122, thanks to Government support. Sterling on New York was less firm at 4.86 13/32.

Silver was weak owing to Indian sales at 30 7/16d. per oz., and Gold remained at 84s. 9¾d. per oz.

The Bank Rate is 5 p.ct., to which it was raised from 4 p.ct. on Dec. 3. Bankers' deposit rates are 3 p.ct. The deposit rates of the discount houses are 3 p.ct. at call and 3½ p.ct. at notice.

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